



**ORGANIC
GARDENING®**

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YOUR BEAUTIFUL YARD

**Easy Steps to Great Landscaping
with Flowers, Vegetables, and Ornamentals**

Happiness

CAN ONLY GROW OUT OF THE EARTH.

—BOB RODALE

YOUR BEAUTIFUL YARD

Easy Steps to Great Landscaping
with Flowers, Vegetables, and Ornamentals

by the editors of
ORGANIC GARDENING®
magazine

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We inspire and enable people to improve their lives
and the world around them.

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From those of us who grow mostly food plants to those of us who grow

mostly ornamentals, we all have ideas of a dream landscape. So why not take them one step further—and turn your ideas into your beautiful yard? It's easy to take your ideas from dream to paper to garden, and we're here to show you how!

Whether you're a seasoned organic gardener or just getting started, this book is your guide to a healthy, bountiful, beautiful garden.

First, we'll take you through the steps for putting pencil to paper and planning your garden and landscape. Then we'll show you how to put those paper plans into action with tips on plant selection, problem-free planting, and easy maintenance for your favorite flowers and vegetables. Along the way you'll find plenty of information on dealing with problem sites, improving your soil, making good use of space, and other techniques to make your organic landscape a success. And don't forget to check out our special insert on easy-care plants—including flowers, vegetables, herbs, and trees and shrubs!

Even a quick look through these pages will provide you with enough ideas to make you want to pull out your hoe and get going. So dig in!

And if you or your neighbors have done something in your landscape that you're excited about or that you think might inspire other organic gardeners, let me know.

Happy gardening!

A stylized, handwritten signature in black ink, appearing to read 'Maria Rodale'.

Maria Rodale

for

ORGANIC GARDENING

THE Landscape OF YOUR Dreams

THE BEST AND MOST SATISFYING GARDENS ARE the result of careful planning and sound design. Whether you want to design a flower garden, plant a shrub border to screen an outdoor patio, or add plantings of vegetables, fruits, and herbs to your yard, there are some basic principles that will help you make decisions as you plan.

You don't have to be an artist to create an attractive and useful environment around your home.

Landscaping is a form of personal expression, an extension of the care you put into arranging the inside of your house. There is no "right" landscape; what works for your neighbor may not suit your needs or look good on your site.

Ready to start **planning** your **dream** landscape?

you particularly like, try to figure out what makes it special. Is there an attractive fence that provides a nice backdrop for the plants? Is there a beautiful tree or shrub you would just love to have for your own property? Has your neighbor come up with a clever way to screen the front yard from the street? You may not want to copy any of these ideas exactly, but they will give you some idea of what is possible for your own home. The unlimited combinations of these elements make it easy to create a landscape that is unique to your property. And that's what landscaping is all about: making the best of your site.

IDEAS Everywhere

START THE DESIGN PROCESS BY LOOKING AROUND for ideas. After all, great landscaping ideas are all around you.

Look at homes in your community and take note of landscapes that catch your eye. See whether a garden club in your area sponsors tours of local gardens; these “open gardens” are a great way to get a close view of plants and design ideas that are appropriate for your area. Public parks and botanical gardens can also give you planting ideas. And don't forget about all of the ideas in *ORGANIC GARDENING*; the magazine is packed with photographs, tips, and success stories.

A ROOM WITH A VIEW

WHEN YOU LOOK AT A LANDSCAPE, TRY TO VISUALIZE it as a series of garden “rooms.” Like a room in a house, each part of the landscape has walls, a floor, and a ceiling. The

walls could be a hedge, a row of trees, a fence, or a trellis. The floor might be turf, mulch, groundcover, crushed stone, or wooden decking. The sky or an arbor may serve as the ceiling.

Breaking a landscape down into rooms makes it easier to identify the elements you need to add or change. For example, if you want to separate your vegetable garden from the rest of your yard, you need some sort of wall. If you don't want to see the garden, you could plant a hedge or install a solid wood fence. If you're enclosing the garden to protect it from animals, you might try a woven wire fence planted with attractive vines. These rooms need doorways, too—don't forget to think about gates or openings in the walls.

When you view a landscape as a combination of these solid elements, the whole process of planning a design is much more manageable. If you see a landscape that

DREAMING UP A DESIGN

READY TO START PLANNING YOUR DREAM LANDSCAPE? Creating a design starts with a wish list, based on the ideas you've gathered from books and neighboring properties. This list should include design ideas, garden structures, and specific plants. This isn't the time to be realistic—go ahead and put down anything that you'd like to see in your yard.

The next step is figuring out what you really need in the landscape. For example, if you do a lot of entertaining, a shady arbor may be just the place for parties.

Once you've started thinking about your yard and what you want it to do, it's time to start a garden notebook. You'll find that keeping all your records in one place is invaluable as you make plans and review the progress of your garden. A good garden notebook doesn't need to be anything fancy—a loose-leaf notebook with a pocket or two to hold pencils and notes will do fine.

Use the “Landscape-Needs Checklist” on page 10 to help you start thinking about what features you'd like to have in your yard. As you review the list, make sure you size up your yard from every perspective: Look out at the yard from inside the house, including the upstairs windows; check out the view from the street, from down the street, from the front door,

L a n d s c a p e - N e e d s C h e c k l i s t

Here's a list of ways you can use plants and gardens to enhance your landscape, along with features you might want to add to your yard. In your garden notebook, jot down all that apply in your situation, but use this list only as a starting point. To unlock all the potential your yard has to offer, think about what activities you would like to have space for and what you'd like your yard to do for you.

- Screen a patio or deck from the neighbors.
- Hide a bare foundation, or transform a dull or ugly foundation planting.
- Add a vegetable garden.
- Add interest along the front of the yard.
- Create a welcoming entrance to the house.
- Create a sitting area under shade trees.
- Add a colorful planting along the driveway.
- Make the front entrance to the house more appealing.
- Create a quiet sitting area outdoors.
- Incorporate an area for composting or tool storage.
- Beautify a lamppost or mailbox.
- Form a boundary around the property.
- Hide an unattractive view or element (like a utility pole, laundry line, or chain-link fence).
- Make an attractive view of the yard from a prominent window indoors.
- Fill a bare spot.
- Create a place to walk in the yard.
- Beautify a garage or outbuilding.
- Surround a bench, trellis, or arbor.
- Give a new home a more finished look.

from the sides, from the back door, from the back boundary line; look back at your house from the yard. Taking a fresh look at your yard will help you identify features you'd like to hide or views you'd like to improve—such as the view out your kitchen window, for example.

Then compare your wish list and landscape-needs checklist. Some things will probably appear on both lists. The rose hedge on your wish list, for example, may match your need to keep romping pets out of the vegetable garden. Other wants and needs may be totally incompatible. If your yard is a popular place for neighborhood football or volleyball games, a delicate rock garden might be out of the question. Also, don't forget to consider maintenance needs.

You don't need professional skills to draw a map of your garden.

SIZING UP Your Site

NOW THAT YOU'VE LOOKED AT WHAT FEATURES AND plantings you'd like to have on your property, it's time to take stock of what conditions you have to work with. Taking a careful look at your site—its soil, climate, and exposure—will make it easier to decide where to locate your vegetable garden, plantings of flowers or fruit, trees, hedges, or other plantings you'd like to add.

See "Inventory Your Site" at right to help you get a better idea of what you have to work with. Take note of wet, shady, and rocky spots, and try to take advantage of them. A wet spot may not be desirable in a play area, but it could be a good place for a group of moisture-loving plants. Also, think of the landscape as it changes through the seasons. Evergreens and berried shrubs, along with a bench in a sunny spot, can make your yard a pleasant winter retreat. A little careful planning can give the landscape four-season appeal. Don't forget details like specimen plants,

interesting rocks, or sculpture to give the garden character.

PUTTING IT ON PAPER

SO NOW THAT YOU'VE TAKEN STOCK OF WHAT YOUR yard has to offer, what do you do next? Map it out!

You don't need professional skills to draw a map of your garden. Using lined graph paper (a sample of which we've conveniently provided on page 12), any gardener can make a usable garden map.

Your first step should be to measure the boundary lines of your property, using a flexible measuring tape that's at least 25 feet long. It's easiest to do this with a helper to hold one end of the tape. If you work alone, stick a pencil through the loop at the end of the tape and push it into the ground to secure it. If you have a survey of your property, you can skip this step. Just use the dimensions on your survey or

Inventory Your Site

You may think you know everything about your yard, but once you start really looking at it, you may be surprised at how many details you've forgotten. Before you draw up your garden plan and goals, collect some facts about your property. Doing this will help you organize your priorities and make realistic plans. Here's a list of important facts and features you'll want to keep in mind as you make your design. You'll need to know about:

- Hardiness zone and local weather conditions.
- Soil condition.
- Drainage, including both wet and dry sites around your yard.
- Exposure, such as areas with full sun, partial shade, or full shade.
- Property dimensions, including a breakdown of the space available for gardens, recreation areas, pet runs, and other areas.
- Existing insect and disease problems.
- Areas to avoid, such as septic-tank fields and underground utility cables or waterlines.
- Locations of essential features, such as a water source, tool shed, or compost pile.
- Established plants and their condition, as well as possible effects on new plants, such as shade or competition for nutrients.
- How much time you have to spend on your yard and garden.
- Microclimates—places that are warmer or cooler than the rest—on your property.

make a photocopy of the survey to use as a base map.

You'll also want to take the measurements of the size of your house and note its location with regard to boundary lines. Make sure to note the size and location of existing garden beds and plantings as well.

Next, sit down with your complete list of

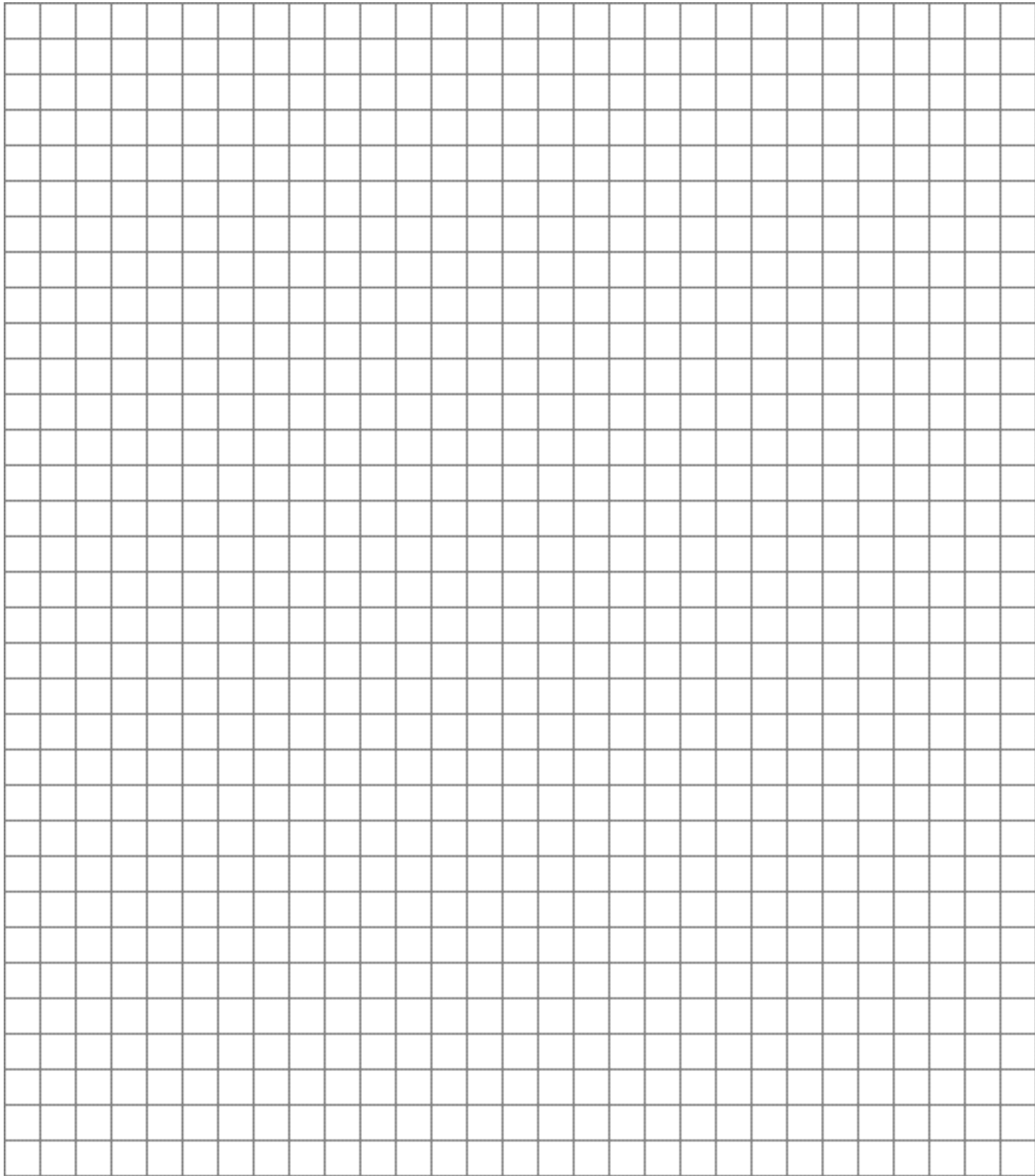
measurements and your graph paper. Choose a scale, such as one square on paper equals 1 foot of actual space.

Draw your boundaries, and then fill in the location of existing buildings and plantings. Make as accurate a plan as possible, and include all your garden's features—paths,

trees, buildings, fences, and walkways. With this base map, you'll have a template to use when sketching in your plans and dreams for the ideal yard and garden.

Rather than drawing your plans directly on your base map, however, it's best to draw on overlays. Use sheets of thin trac-

ing paper as overlays to sketch in ideas and see how they fit while you work on the design. That way, you can use your master plan again and again until you decide on the best arrangement of pathways, flowerbeds, and other features. Then transfer the final design to your master plan.



Don't **forget** to consider your own everyday **needs**.

PLANNING FOR Practicality

WHEN YOU DESIGN YOUR HOME LANDSCAPE, make sure that the finished plan fits your needs. Don't add a deck just because all your neighbors have them in their backyards if what you really want is a door-yard herb garden. And while you don't want to copy your neighbors exactly, try to keep the general theme of the area in your design. A woodland garden in the Southwest would look as out of place as a cactus garden in New England. By using plants that are best adapted to your area, you'll give your landscape the appropriate regional look, and you'll have healthier plants, too.

There are some other basic practical considerations to keep in mind while you're designing your landscape. A variety of people need to have access to your property. Oil or gas delivery people need

to get to the tank or inlet. Meter readers need to get to the meters. Be sure to accommodate their needs when you plan. An element as simple as a short stepping-stone path through a flowerbed to a meter enables the reader to get in and out without damaging your plantings.

Electric, telephone, and cable television service people may trim trees that grow near their lines. It pays to design plantings that they'll be able to work around.

Don't forget to consider your own everyday needs as well. Have you planned your paths so you'll be able to get your mower and garden cart where you need to go? Is it easy to take out the garbage?

And, of course, don't plan, and certainly don't dig, before finding out where underground utilities run.

R e d u c i n g L a n d s c a p e M a i n t e n a n c e

Keep these timesaving pointers in mind when designing your yard.

- ➊ On a steep, hard-to-mow slope, build terraces to break the slope into steps, or plant the incline with groundcovers.
- ➋ Don't struggle with sparse, weedy grass under trees; surround trees with beds of shade-loving plants.
- ➌ Avoid using sharp angles or fussy curves when laying out flowerbeds; mowing is less difficult along straight lines and smooth curves.
- ➍ Reduce lawn area and mowing time by installing low-maintenance groundcovers or decking.
- ➎ If you really want to grow fruit, try easy-to-grow bush cherries, blueberries, strawberries, or raspberries.
- ➏ Choose disease- and insect-resistant plants to reduce pest control problems.
- ➐ Use edgings. They can keep grass out of flowerbeds, prevent gravel from scattering over a flagstone walk, and cut down on trimming.
- ➑ Choose hedges, shrub borders, and specimen plants that have natural-looking, informal shapes. Sheared hedges and other plantings require frequent trimming to keep them looking neat.
- ➒ Choose plants that don't make a mess by dropping seedpods, sap, or lots of large leaves. Also avoid plants that are prone to problems in your area. They will look messy and take up your time as you try to keep them healthy.
- ➓ Make a few large beds around a number of trees and shrubs, rather than dozens of little planting islands that take lots of time to mow and trim around.

Repeating an element throughout a garden adds harmony.

THE ART OF Gardening

YOUR SITE WILL DETERMINE SOME OF YOUR design choices. For example, the style of your home may influence the feel of the design you'd like to have. If you have a brick house, the landscape might include brick paths and clipped evergreen hedges. A house with natural wood siding lends itself to wood-chip paths and rail fencing. You'll also need to plan access areas, such as paths, steps, and ramps.

WHAT'S THE FEEL?

THERE ARE TWO GENERAL TYPES OF GARDEN design styles—formal and informal. Formal gardens exhibit classical symmetry.

Flowerbeds, terraces, pools, and other features are generally rectangular (or sometimes round), and walks are straight.

Formal gardens are not necessarily grand; gardens designed in this manner can be unfussy and simple.

Informal gardens feature curved, free-form flowerbeds that sweep along the land's features. Lawns, terraces, walkways, and other features are also irregularly shaped, with one gentle arc leading to another. Natural-looking woodland wildflower gardens and free-form island beds of perennials are both examples of informal style. If the lay of your land is irregular, it will lend itself to an informal design.

BASIC DESIGN PRINCIPLES

REGARDLESS OF STYLE, ALL WELL-DESIGNED GARDENS make use of three essential principles—balance, proportion, and repetition—to blend the various parts of the garden into a harmonious whole.

Balance. When elements on two sides of a central point are similar in size or visual weight, they are balanced. Balanced design gives the viewer a peaceful, restful feeling; unbalanced, lopsided design is unsettling. Balance doesn't necessarily mean symmetry; you don't need mirror-image plantings to achieve it. Several good-size clumps of a plant can balance one large one, for example. Symmetrical balance is a hallmark of formal gardens; and asymmetrical balance, of informal gardens.

Proportion. Garden features (plants, flowerbeds, terraces, and so forth) are in proportion when their scale is in good relationship to their surroundings. For example, a large clump of 9-foot-tall giant reed planted in a bed with low-growing, 2- to 3-foot perennials creates a picture that is out of proportion. Similarly, a huge shed would be out of proportion in a small yard.

Repetition. Repeating an element—color, texture, shape, or even building materials like landscape timbers—throughout a garden adds unity and harmony to a design, so the parts of the garden fit together more closely. For example, repeating the color red at intervals in a flowerbed leads the eye through the design and creates a feeling of wholeness and rhythm. You can repeat the same plant or use different species with similarly colored blooms to achieve the same effect.

Strive for balanced distribution of color.

PLANTS AND Design

THE COLOR, HEIGHT, FORM, AND TEXTURE OF PLANTS play a vital role in any garden. All plants change from season to season and year to year. They may grow taller than planned, spread too vigorously, or not bloom when expected. Balancing and working with these changes is what makes gardening an art. Even the most carefully designed gardens are never static; their owners adjust and develop the design over time.

COLOR CONSIDERATIONS

IN A GARDEN, COLOR CAN BE USED IN MANY different ways. One gardener may prefer bright reds and yellows; another, soft pinks, blues, and lavenders. Color can influence the mood of a garden. Hot colors—vibrant reds, oranges, and yellows—are cheerful and bright. Cool colors—greens, blues, and purples—are more serene.

Color can also influence perceived per-

spective. Hot or warm colors appear to bring an object or scene closer. Cool colors tend to recede and push the object farther away, so they're a good choice for making a small garden seem larger. Use them in large clumps to catch the eye, and remember that they can be easily overwhelmed by warm colors.

Use balance, proportion, and repetition to design your color scheme. Strive for balanced distribution of color. A large planting of one color can overwhelm a design. Repeating a color at intervals can unify the design. Use clumps of a single plant or several different species with the same flower color.

BALANCING HEIGHT AND FORM

PLANT HEIGHT AND FORM SHOULD BE BALANCED and in proportion. In a planting in front of a fence or other backdrop, plant the tallest

B u d g e t - S t r e t c h i n g I d e a s

There are many ways to stretch your gardening dollar. Here are a few to consider.

- For a soil-enriching boost of almost-free fertilizer and organic matter, plant a green manure crop like annual ryegrass, soybeans, or buckwheat and till it under before planting.
- Making a nursery bed is a great way to save money on plants. If your design calls for lots of groundcovers or hostas, for example, buy only a plant or two. Then systematically propagate them for a year or more by division, cuttings, or layering, depending on the species, until you have a small nursery of plants to move to your garden.
- Make compost. It saves money on purchased mulch and soil amendments, makes great fertilizer, and recycles valuable nutrients.
- Ask your local utility company who does their tree work, and call. Many will provide free mulch by dumping wood chips on your property.
- Spend your money on the best—not necessarily the most expensive—materials possible; they'll last longer and be a better investment.
- Order plants with a friend or group to take advantage of volume discounts.
- Plan before you shop, and buy only what you need. Impulse shopping is costly.
- Include some edibles in your design. You'll harvest tasty food and save money.
- Recycle what you have, use found materials, and make the best use of existing plants and features.
- Trade plants with neighbors. Almost everyone has too much of something, and these "extra" plants are often fast-growing—take just what you need for quick color.

plants in the back, the shortest in the front. If the planting bed's shape is free-form, put the tallest plants at the widest parts of the border. In island beds, which can be viewed from all sides, plant the tallest plants in the center, with shorter ones around the edges.

Form refers to a plant's shape—round, vertical, creeping, or weeping, for example. It's used to describe the entire plant or just the flowers. For example, delphiniums are vertical plants with spike-shaped bloom stalks; marigolds are mound-shaped with round blooms. Intersperse different plant forms throughout a design for balance and interest. Form can be used like color, although it's more subtle. Repeating a form at intervals strengthens unity and harmony. You needn't repeat the same plant to achieve this effect; several plants with similar forms will do.

INCORPORATING TEXTURES

PLANT LEAVES CAN LOOK COARSE, CRINKLED, glossy, fuzzy, or smooth. Flowers can be feathery and delicate or waxy and bold. Using plants with a variety of textures—and repeating interesting textures at intervals—adds interest and appeal. Like form, texture is a subtle characteristic.

Keep in mind what landscape purpose the garden is to serve.

DOWN TO Size

SEVERAL FACTORS PLAY A ROLE IN DETERMINING the best size for the individual gardens in your design. Available space may be the main consideration, but keep in mind what landscape purpose the garden is to serve. For example, if you need a shrub border to screen an unattractive view or create a private patio space, determine the size by walking around your yard and studying where the largest plants need to be planted to accomplish your purpose. Smaller shrubs and perennials that connect these larger plants into a continuous border can be filled in later, as time and budget permit. The beauty of having an overall plan is that nothing is planted haphazardly and you'll be able to work gradually toward your goal.

For a flower garden that blooms all season, you'll need enough space to accommodate a variety of plants that will provide

an extended bloom period. About 125 square feet will give you enough room to mass flowers for a succession of color. For a formal garden, a 5-foot by 25-foot rectangle, two 5-foot by 12 ½-foot beds, or a 12-foot-diameter circle all provide about 125 square feet. In an informal garden, make the shapes free-form, or plan several related beds divided by plants. In general, don't plan gardens that are less than 4 or 5 feet wide if you want a lush effect. Don't plan them any wider if you want to be able to tend the plants without stepping into the bed, or else lay out an access path on either side.

And, of course, time and money are always considerations.

Once you actually have a plan, the next step is to carry it out—and create the landscape of your dreams!

YOUR No-Fail Flower Garden

WHAT CAN BRIGHTEN A YARD LIKE FLOWERS? They add color to any yard, whether you use them along the front of your foundation planting, to line a walk leading to a patio, to brighten a shady spot, or throughout your entire landscape. Watch a winter-bare bed erupt with purple crocuses and golden daffodils, or the late-autumn sun set behind a planting of purple asters and yellow goldenrod, and you won't be able to resist growing more.

There are **perennials** for any cultural **condition**.

PLANNING FOR Landscape Success

ALTHOUGH YOU CAN INCORPORATE ALL TYPES OF flowers throughout your yard, there are ways to use perennials, annuals, and bulbs to best advantage. Here are some suggestions that will help you plan ways to use them in your landscape.

PERENNIALS: PERMANENT BEAUTY

PERENNIALS ARE ALL-PURPOSE PLANTS—YOU CAN grow them wherever you garden and in any part of your garden. There's a perennial to fit almost any spot in the landscape, and with a little planning, it's possible to have them in bloom throughout the frost-free months. In addition to an endless variety of sizes, shapes, colors, and plant habits, there are perennials for nearly any cultural condition your garden has to offer.

Most perennials prefer loamy soil with even moisture and full sun. Gardeners who

can offer these conditions have the widest selection of plants from which to choose. However, there are dozens of perennials for your problem sites, too.

Perennials add beauty, permanence, and seasonal rhythm to any landscape. Their yearly growth and flowering cycles are fun to follow—it's always exciting to see the first peonies pushing out of the ground in April or the asters braving another November day. Here are some ways to use perennials effectively in your yard.

Borders. If you have a fairly long area that could use some color, such as a fence, a rock wall, or the side of a building, consider a perennial border. Group plants with similar requirements for soil, moisture, and sunlight. Also plan for pleasing color combinations and arrange them by height, form, and texture to create garden pictures.

Beds. Another way to use perennials is

P e r e n n i a l s f o r D r y S o i l

These tough plants tolerate both heat *and* dry soil, making them useful for spots that the hose can't reach and nice for sunny meadow gardens. The plant name is followed by bloom time and color.

- Artemisias (*Artemisia* spp.);
summer; gray, white, yellow
- Baptisias (*Baptisia* spp.);
spring to summer; blue, white, yellow
- Blanket flower (*Gaillardia* x
grandiflora); summer; red, yellow
- Blue flax (*Linum perenne*); spring; blue
- Common thrift (*Armeria maritima*);
summer; pink, white
- Coneflowers (*Rudbeckia* spp.);
summer; yellow
- Coreopsis (*Coreopsis* spp.);
spring to summer; yellow
- Daylilies (*Hemerocallis* spp.);
spring to summer; all colors except blue
- Globe thistle (*Echinops ritro*);
summer; dark blue
- Golden Marguerite (*Anthemis tinctoria*);
summer; yellow, orange
- Goldenrods (*Solidago* spp.);
late summer to fall; yellow
- Lamb's-ears (*Stachys* spp.); spring; purple
- Pinks (*Dianthus* spp.);
spring; pink, red, white, yellow
- Sages (*Salvia* spp.); summer to fall; all colors
- Sea hollies (*Eryngium* spp.);
summer; blue, silver-blue
- Sedums (*Sedum* spp.); spring to fall; yellow,
pink, white
- Spurge (*Euphorbia* spp.); spring to summer;
yellow, red
- Statice (*Limonium* spp.); summer; blue, red,
white, yellow
- Tall gayfeather (*Liatris scariosa*); summer;
purple, white
- Torch lilies (*Kniphofia* spp.); late spring; red,
orange
- Yarrows (*Achillea* spp.); spring to summer;
yellow, white, red
- Yuccas (*Yucca* spp.); summer; white

in beds. A bed differs from a border in that it is freestanding, without an immediate background such as a fence or wall. Plant beds to add color and drama to the sides of a path, use them to define and enliven the edge of a patio or deck, or create an island bed in your lawn to relieve all that green with a bright splash of color. Plant the tallest plants in the center of the bed, using progressively shorter ones toward the edges.

Specimen plants. Larger perennials make striking specimen plants. You can use them in the landscape wherever you want an accent but don't want to feature something as large or heavy-looking as a shrub or tree. Try a large clump of peonies at the corner of the house or use a specimen plant to point visitors to a specific view of the yard or mark the beginning of a path. For example, a bold accent like a very large-leaved hosta at a bend in a shady garden will attract attention and pull visitors into the garden.

ANNUALS: CONTINUOUS COLOR

WHEN MOST PEOPLE THINK OF ANNUALS, THEY think of color, and lots of it. Annuals are garden favorites because of their continuous, season-long bloom. Colors run the spectrum from cool to hot, subtle to shocking. Plants are as varied in form, texture, and size as they are in color.

Annuals have as many uses as there are places to use them. They're excellent for providing color in the garden from early summer until frost. They fill in gaps between newly planted perennials. They're popular as cut flowers. Annuals can make even the shadiest areas of the late-summer garden brighter. And since you replace annuals every year, you can create new garden designs and experiment with different color schemes as often as you like.

You can use annuals alone or in combination with perennials or other kinds of plants. Bedding out is the traditional way of using annuals. The Victorians created

L i g h t U p t h e S h a d e

There are dozens of choice perennials to brighten a shady site. Many plants in this list grow well in partial shade; the plant name is followed by bloom time and color.

Alumroots (*Heuchera* spp.); spring to summer; pink, red, white, green

Astilbes (*Astilbe* spp.); late spring to summer; red, pink, white

Bergenias (*Bergenia* spp.); early spring; rose, pink, purple, white

Bleeding hearts (*Dicentra* spp.); spring; rose, pink, white

Bugbanes (*Cimicifuga* spp.); summer to fall; white

Columbines (*Aquilegia* spp.); spring to early summer; all colors, bicolors

Epimediums (*Epimedium* spp.); spring; pink, red, yellow, white

Hellebores (*Helleborus* spp.); early spring; white, rose, green, purple

Hostas (*Hosta* spp.); early to late summer; violet, lilac, white

Jacob's ladders (*Polemonium* spp.); spring to summer; blue, pink, white, yellow

Lungworts (*Pulmonaria* spp.); spring; purple-blue, blue, red

Siberian bugloss (*Brunnera macrophylla*); spring; light blue

Solomon's seals (*Polygonatum* spp.); spring; white, white-green

Virginia bluebells (*Mertensia virginica*); spring; blue, white

Most spring bulbs, such as daffodils, and little bulbs, such as crocuses, do beautifully in shaded gardens. And don't forget about annuals and biennials to perk up your shady sites throughout the entire summer season. It's surprising how many annuals tolerate shade. Impatiens, lobelia (*Lobelia erinus*), and wishbone flower (*Torenia fournieri*) will all tolerate full shade. Pansies, wax begonias, Madagascar periwinkle (*Catbananthus roseus*), summer forget-me-not (*Achusa capensis*), and sapphire flowers (*Browallia* spp.) are all outstanding annuals for partially shaded areas. Biennials for shade include foxglove, forget-me-nots, Canterbury bells (*Campanula medium*), and money plant (*Lunaria annua*).

extensive, colorful displays, usually with intricate patterns against emerald lawns, called bedding schemes. That's why annuals are often called bedding plants.

You can take a tip from the Victorians and create formal or informal designs in island beds or in borders. Fences, hedges, and brick or stone walls all make attractive backdrops for annual gardens. Annuals are also a good choice for outlining or edging garden spaces. Petunias, marigolds, bego-

nias, and zinnias are ideal for beds in the sunny garden.

Many perennials are slow-growing by nature, so the average perennial garden takes up to three years to look its best. Annuals are perfect for filling in the gaps between new perennials and carrying the garden through the first few seasons. Take care not to crowd or overwhelm the permanent plants—try midseason pruning or staking of overly enthusiastic annuals.

BULBS: SPRING FANCIES

IN SPRING, MOST GARDENERS' FANCIES TURN TO thoughts of bulbs—especially crocuses, daffodils, and tulips. But bulbs light up the garden throughout the year. Dahlias, lilies, glads, and many other familiar flowers are classified as bulbs. Here are some effective ways to use bulbs in your landscape.

Bulbs with groundcovers. Bulbs grow beautifully in groundcovers. There's nothing like a dark green groundcover background to make daffodils sparkle. Try them with pachysandra, English ivy, prostrate junipers, or common periwinkle (*Vinca minor*). Lawn grass is one groundcover that does not combine well with tall spring bulbs like daffodils. The reason is simple: Bulb foliage needs 8 to 12 weeks to ripen after bloom so the bulb can store enough food for the following season. By the time the daffodil or tulip foliage is ripe, the grass would be knee-high! If you enjoy the sight of blooming bulbs in your lawn, plant low-growing species like crocuses because their foliage generally matures before grass needs cutting.

Bulbs with perennials. With the exception of tender bulbs like cannas (*Canna* spp.) and dahlias that must be dug every year or treated as annuals, bulbs are perennial and should be used like perennial flowers. In fact, they're ideal companions for perennials. In spring, bulbs add color to the perennial garden when little else is in bloom, and perennials hide unsightly bulb foliage while it ripens. Peonies, hostas, daylilies, irises, and asters are especially good with bulbs.

Bulbs with trees and shrubs. Don't forget the beautiful show spring-blooming bulbs make under deciduous trees and

P e r e n n i a l s f o r M o i s t S o i l
Grow these perennials where you have a poorly drained or boggy spot in your yard. The plant name is followed by bloom time and color.

Astilbes (*Astilbe* spp.); late spring to summer; red, pink, white
Bee balm (*Monarda didyma*); summer; red, white, pink, purple
Bonesets (*Eupatorium* spp.); late summer to fall; purple, blue, white
Bugbanes (*Cimicifuga* spp.); late summer to fall; white
Common sneezeweed (*Helenium autumnale*); late summer; yellow, bronze
Globe-flowers (*Trollius* spp.); spring; orange, yellow
Goat's beards (*Aruncus* spp.); late spring; creamy white
Great blue lobelia (*Lobelia siphilitica*); late summer; blue
Japanese iris (*Iris ensata*); summer; pink, blue, purple, white
Japanese primrose (*Primula japonica*); late spring; pink, red, white, purple
Loosestrifes (*Lysimachia* spp.); early to late summer; yellow, white
Marsh marigold (*Caltha palustris*); spring; yellow
Meadow rues (*Thalictrum* spp.); summer; lilac, pink, yellow, white
Meadowsweets (*Filipendula* spp.); summer; pink, white
Rodgersias (*Rodgersia* spp.); late spring to summer; creamy white, red
Siberian iris (*Iris sibirica*); spring; blue, white, purple, wine red
Spiderworts (*Tradescantia* spp.); summer; blue, pink, white, red
Virginia bluebells (*Mertensia virginica*); spring; blue, white
White turtlehead (*Chelone glabra*); summer; white with red tinge
Yellow flag (*Iris pseudacorus*); early summer; yellow

shrubs. For best results, avoid planting bulbs under trees such as beeches and some maples that have very aggressive surface roots, which will outcompete the bulbs.

Bulbs with annuals. Annuals are perfect for covering dying bulb foliage or gaps in the flower border left by dormant bulbs. Marigolds, snapdragons, wax begonias, impatiens, and zinnias are all good "filler" annuals.

Bulbs with other bulbs. Don't forget about planting bulbs with bulbs. Clumps of mixed daffodils or scatterings of other types of spring-blooming bulbs such as tulips or crocuses are well-known signs of spring.

Choose **plants** that
are **hardy** in your area.

SIMPLE GARDEN Design

DESIGNING A FLOWER GARDEN—ESPECIALLY ONE that features perennials—may seem overwhelming at first since there are so many to choose from. But chances are your growing conditions are right for only a fraction of what's available. Let your moisture, soil, and light conditions limit the plants you choose. And don't forget to choose plants that are hardy in your area.

SKETCHING YOUR SITE

THE FIRST STEP IN PLANNING A FLOWER GARDEN is to choose the site you'd like to plant. If you're determined to grow sun-loving plants, the site should receive 6 to 8 hours of direct sun. It's also best to select a site with good air circulation and shelter from strong winds. Take some time to examine your chosen site and learn about its soil and other characteristics so you can select plants that will grow well there.

When you've picked a site, outline the shape and size of your proposed bed right on the spot with a garden hose or string. Next, draw a rough sketch on paper showing the shape of the bed, then measure and record the dimensions. Indicate north on your sketch with an arrow. Next, draw the shape of your bed or border to scale on a piece of graph paper. A good scale to begin with is one that assumes 1 inch on paper equals 1 foot of garden area.

To get an idea of how many plants you'll need, consider the approximate size at maturity of the different types of plants you want to include in your garden. Perennial plants generally need 2 to 4 square feet at maturity; that means you can fit between 30 and 60 of them in a 125-square-foot garden. Shrubs and small trees may need 9 to 25 square feet or more.

SELECTING PLANTS

WHILE IT'S RELATIVELY EASY TO PLAN AND PLANT an annual garden, selecting plants for a perennial garden is a challenge. There are literally thousands to choose from and a confusing array of flower colors, sizes, shapes, and textures. Start with a list of favorite plants, then add ones you've admired in other gardens, nurseries, photographs, books, magazines, and nursery catalogs. Leave plenty of space between plants for making notes. Jot down plant descriptions, growing tips, bloom time, height, color, hardiness, and culture.

Keep an eye out for perennials with good foliage and a long season of bloom. Trees and shrubs with winter interest—like evergreens or ones with ornamental bark or branching habits—are also invaluable. Don't worry about making your plant list too long.

Then review your list and cross off plants that won't grow well in the site and don't fit your needs. If you have only shade to offer, cross off plants that need full sun. Do you want only easy-care plants? Eliminate those that need staking or deadheading to look their best.

CHARTING YOUR SELECTIONS

NEXT, MAKE A CHART TO HELP IDENTIFY PLANTS that will add the most to your design. On a clean sheet of paper, make a column on the left labeled "Plant Name and Bloom Season." Draw lines across the page at intervals to indicate sections for each season of bloom. If you have a large garden, you can use a separate sheet for each bloom season. Write down the bloom seasons you want in the first column—early, mid-, and late summer, for example. Leave enough space under each season to list plant names.

Divide the right side of the paper into three or four columns to indicate plant heights and another three or four columns to indicate flower colors. Add an extra

Flowers for Containers

To add color and excitement to a deck, patio, balcony, or entryway, try containers filled with annuals and perennials. You can mix several types of annuals or perennials together, combine the two, or plant just a single perennial per container.

Annuals are perfect container plants. Their fast growth, easy culture, and low cost make them irresistible for pots, window boxes, and planters. You can start container gardening in early spring with pansies. Summer and fall bring endless choices for sun or shade. Zonal geraniums, ornamental cabbages, and snapdragons remain attractive until hard frost. Tender perennials that are usually grown as annuals, including zonal geraniums, coleus, and lantana (*Lantana* spp.), can be pruned and brought indoors for the winter.

Many perennials also grow well in containers. Try a daylily in a half barrel in a sunny spot or hostas with variegated foliage in a shady one. Ornamental grasses make very attractive container specimens, as do most herbs. Since containers dry out quickly, choose plants that tolerate some dryness for best results.

Whatever you plant, select as large a container as you can comfortably manage. Small containers dry out far too quickly and create extra work. Be sure all the containers you use have drainage holes. Choose a light soil mix that drains well but holds moisture. Don't overplant: Crowded plants don't bloom well and require constant watering. Fertilize containers regularly with a balanced organic fertilizer.

column to indicate plants with attractive foliage or winter interest.

Starting with the first plant on your list, enter it under the appropriate bloom season on your chart. Then indicate height and color with X's in the appropriate columns. Repeat this process for each plant on your list. When you finish, look the chart over to make sure you have a fairly equal representation of X's under each column. Will some flowers of each color be blooming in each season? Add and subtract plants until you have a balance in all the categories and a manageable number of plants to grow. Last, number the plants on your list. Use these numbers to fill in the spaces as you draw your garden.

DRAWING YOUR DESIGN

TO DRAW YOUR DESIGN, USE TRACING PAPER OVER the scale drawing of your garden that you made on graph paper. That way, you can start over easily if you need to. Begin drawing shapes on the paper to indicate where each plant will grow. Try to draw them to scale, based on the sizes you charted as described above. Instead of drawing neat circles or blocks, use oval or oblong shapes that will flow into one another.

Arrange plants, especially perennials and small shrubs, in clumps of several plants. Because of the basic design principles of balance and repetition, you'll want to repeat clumps of at least some species. As a general rule, you'll probably want half

Balance Your Flowers

Combining trees and shrubs with flowers can be a balancing act. It's all too easy to end up with an awkward-looking mixture of giant trees and tiny flowers. To make sure your mixed beds are balanced-looking, keep these hints in mind:

- For every tree, plan on three shrubs grouped around the base. Group large shrubs around tall trees and smaller shrubs around shorter trees.
- For every shrub, add at least five perennials or annuals. Choose some that have a tall, spiky form, some medium-size plants, and some low-growing groundcovers.
- Strive for a smooth transition from tall trees to large and medium-size shrubs down to taller perennials, then midsize blooming plants, and finally groundcovers.

as many species of plants on your list as the number of individual plants you can fit in your border.

Beginning with the first plant on your list, study its "profile" and decide where you want to plant it in the garden. Transfer its name or number to the corresponding shape—or shapes if you want to repeat it more than once—on your diagram. Do this with all the plants on your list.

As you work, you'll have to decide how many of each plant you want to grow. You may wish to follow the "rule of three" for perennials that are relatively small at maturity. Three plants will make an attractive clump when mature. For large plants, such as peonies, you may want only one plant; for others, two. Also consider color combinations as you work, and avoid large masses of single colors.

As you grapple with these problems and refine your design, expect to have to redo your design several times before you feel you have it right. Each sheet of crumpled paper brings you closer to your goal of creating a beautiful garden.

When you're ready to make your garden plan a reality, it's time to head out to the nursery or pick up the plant catalogs and buy your plants.

How will you **acquire** the **plants** you need?

BRING YOUR Paper Garden to Life

THE PLANNING AND PLOTTING IS DONE, YOU'VE picked the flowers you want to grow, and now it's time to turn your paper garden into reality. As you move from planning to planting, issues of site selection and design give way to other questions. The first question: How will you acquire the plants you need? Your options include everything from one-stop shopping at the garden center to growing each and every flower from seed.

BUYING HEALTHY PLANTS

BUYING PLANTS OR SEEDS, ESPECIALLY IN THE spring, is almost as easy as buying food or clothes. Nearly every large discount or department store has a garden section that is well stocked for the growing season. Local greenhouses, nurseries, and garden centers are great sources of plants

that will do well in your climate. And mail-order companies offer an extensive selection of plants and seeds at a variety of prices. And friends and neighbors also are often good sources of plants.

Here are some guidelines that will help you find the plants you need.

Shop wisely. Visit local garden centers or nurseries to see whether they offer the plants you want. Take your plant list, but also consult knowledgeable employees who can help you make your selections. They may suggest different cultivars of plants you're looking for or other sources of certain plants. If a nursery doesn't have employees who are knowledgeable about the plants, or the plants don't look healthy to you, consider shopping elsewhere. Be flexible as you shop—you may come across new plants that fit your plan. But watch out for budget-busting impulse purchases that seem like a good idea but

don't suit your plan or your site.

Look for local plant sales. If there's a botanic garden or arboretum in your area, find out whether it holds plant sales.

Grow a green tongue. A little communication goes a long way, especially if you're new to gardening or you're gardening in a new place. Start talking to people about gardening: Ask questions, and share your own gardening plans. Plant enthusiasts generally love talking about gardening. They can recommend the best nurseries and garden centers, specific plants, or special growing techniques for your area. If you see a garden you admire, introduce yourself—a wealth of knowledge and friendship can grow right along with the plants!

Organize a seed and plant exchange. To stretch your budget, ask gardening friends and neighbors to meet and share or swap extra plants, divisions, cuttings, or seeds. Use this gathering to coordinate group orders of seeds or plants to extend your flower funds even further. Don't forget to trade plants during the growing season, too, as extra seedlings pop up or plants need dividing.

Buy plants by post. Mail-order nurseries and garden supply companies send out a wave of catalogs each winter—inflicting gardeners nationwide with a case of spring fever. Selection is one advantage of mail-order shopping—you'll generally be able to choose from many more plants than are offered at your local garden center. When you shop by mail, make sure the plants and seeds you order will be as happy in your garden as they are in the catalog photos. Check hardiness before you order, and find out whether the supplier guarantees plants against losses or damage during shipping.

STARTING FLOWERS FROM SEED

STARTING YOUR OWN PLANTS FROM SEED ISN'T just practical, it's fun, too. Lots of flowers are easy to grow from seed, and seed is

often the way to go if you're looking for special colors of annuals or unusual perennials that aren't available from local suppliers. With a little bit of time and space and a few supplies, you can grow lots of flowers at minimal cost.

You can start seed indoors before the growing season begins, or direct-sow the seeds in your flowerbed after the soil warms up in the spring.

Starting seed indoors gives most perennials the time they need to produce blooms by summer. For successful seed-starting indoors, you'll need containers, growing medium, and seeds. You'll also need a sturdy (and preferably waterproof) flat surface near a good light source—either a south-facing window or a strong source of artificial light. (Newly sown seeds don't need to be under lights or in a window, although they can be. Once the seeds have germinated, a good light source is essential to healthy growth.) A location where you can maintain temperatures of 65° to 75°F will also contribute to good germination and healthy growth. Start out small: You can always add new crops as your technique improves and your confidence grows. Once your seeds are sown, they won't need much attention, but plan to spend some time watering and observing at least once a day.

Timing is important when you're growing plants from seed. If you start them too early, you'll have overgrown and leggy seedlings in spring, and if you start them too late, you'd be better off direct-seeding them outdoors. It's easy to avoid both problems by setting a planting schedule and placing your seed order early. Seed catalogs usually arrive in early winter; if you place your order then, you'll get the best selection and possibly a price break. The seed packet should tell you how many weeks the seeds need to reach transplant size, whether they need any pretreatment to sprout, how deep to plant them, and what soil temperature range promotes good germination. Use this information to set a calendar schedule. If you stick with your schedule, your seedlings will be the right size when planting time arrives in spring.

Before you open a seed packet or sow a seed, moisten your growing medium thoroughly. You can do this before you fill your containers by filling a bucket with medium and adding water. The medium should be moist and crumbly but not soggy. Fill your containers with moistened growing medium to $\frac{1}{4}$ inch from the top, and plant your seeds according to package directions. Sow seeds at a depth approximately three times their diameter.

If you're planting in a flat or other open container, use a plant label or pencil to make shallow furrows. Mix very fine seeds with sand and sprinkle them over the surface with a salt shaker. If you're planting in individual containers, plant one to three seeds in each, but be prepared to thin out extras if more than one comes up. Cover seeds lightly with dry growing medium, and mist it gently to moisten the surface.

Don't count on your memory to tell you what's growing in each container. Label everything at planting time with the plant name and the date. Use waterproof labels and write on them with a permanent marking pen so the information won't wash off, leaving a mystery crop.

After planting, place a clear plastic bag (or rigid lid) over each container and secure the open end. Place individual pots together on a tray and cover them with a sheet of plastic. This helps hold in the moisture and heat necessary for good germination. If you don't cover your newly planted pots or flats, you'll need to water frequently to keep them from drying out. Water with a gentle spray or mist to avoid dislodging your seeds.

A source of gentle bottom heat encourages germination. Set your containers on top of your refrigerator, TV, or water heater until the seeds begin to sprout. If you'd rather not adorn your appliances with pots and flats, heating cables and mats are available to keep your future flowers cozy. And most seeds will sprout without bottom heat, as long as the room temperature is appropriate and they're kept moist.

Time from planting to germination varies, but most seeds of herbaceous plants will germinate in one to three weeks. If after waiting patiently you think your seeds will never come up, gently lift one out of the growing mix and check to see whether it is rotten or dry. Seeds that are too wet will rot; dry seeds will never sprout.

Once your seeds have sprouted, a new phase of care begins. For strong, healthy seedlings:

Ensure even moisture. Remove the

The Essential Ingredients

Here's some advice to get your seeds off to a great start indoors.

Choose containers that fit your selected growing space and have drainage holes in the bottom. For seed-starting, there are basically two types. Broad, open flats let you sow many seeds in one container; the tiny seedlings are later lifted and transplanted to individual pots. Peat pots, peat pellets, and cell packs are designed for growing individual seedlings, sometimes until they are planted out.

Starting seeds in peat pots or pellets simplifies things at transplanting time—just stick both plant and pot in the ground. Your seedlings benefit, too, since their roots are not disturbed during planting.

Sow your seeds in any fine-textured, well-drained medium. The pre-mixed ones that are commercially available are excellent and easy to use. A sterile, soilless growing medium is best because it reduces the risk of losing your crop to diseases such as damping-off. (Seedlings don't need a nutrient-rich mix.) A typical seed-starting mix combines equal amounts of peat moss and vermiculite, but you could also use compost, pasteurized potting soil, or perlite, or a combination of these. Essentially any light, porous medium that holds moisture, drains well, and provides physical support will do.

Easy Annuals from Seed

If you're starting seeds for the first time, bolster your confidence with one or two crops that are almost sure to do well. Try:

Cockscomb (*Celosia cristata*)
Cosmos (*Cosmos bipinnatus*)
Flowering tobacco (*Nicotiana glauca*)
Garden forget-me-not
(*Myosotis sylvatica*)
Globe amaranth
(*Gomphrena globosa*)
Impatiens (*Impatiens wallerana*)
Love-in-a-mist (*Nigella damascena*)
Nasturtium (*Tropaeolum majus*)
Morning glory (*Ipomoea* spp.)
Pot marigold (*Calendula officinalis*)
Rose moss (*Portulaca grandiflora*)
Salvia (*Salvia* spp.)
Snapdragon (*Antirrhinum majus*)
Zinnia (*Zinnia angustifolia*)

plastic covering from the seed flats or containers as soon as seedlings appear. Keep the growing medium moist but not wet, preferably by watering from the bottom. To bottom-water, place the container in a larger pan of water and let the water soak up through the drainage holes into the medium. Then set the container aside and let the excess water drain off. Don't let your seedlings sit in water—they'll rot. If bottom watering isn't practical, water your seedlings with a gentle spray or mist, taking care to avoid flattening them or washing them out of the medium.

Provide plenty of light. Light is critical now. Move the seedlings to full sunlight (if they're not in it already), or place them under fluorescent lights for 14 to 16 hours per day. The twin fluorescent tubes found in most shop lights work well. "Plant" or "grow" lights are fine, but they cost more and are unnecessary for successful growth at this stage. Don't use incandescent bulbs—they give off too much heat and produce the wrong kind of light for healthy

growth. Hang the lights no more than 3 to 6 inches above your seedlings. An inexpensive appliance timer can save you the trouble of remembering to turn the lights on and off every day and helps ensure that your seedlings get the light they need. If your seedlings begin to grow tall and spindly, increase the amount of light they get daily and move them closer to the light source.

Keep track of temperature. Most seedlings grow well under daytime temperatures of 70° to 75°F and night temperatures that range from 60° to 65°F.

Control diseases. Good air circulation is very important at this early stage. The warm, humid conditions seedlings love also encourage damping-off, a common and deadly fungal disease of seedlings. Affected stems turn black at the soil line and collapse. To help prevent this devastating fungus, allow the soil surface to dry slightly between waterings, use a small fan to keep air moving (gently) around your seedlings, and thin out crowded plants. If damping-off does occur, remove and discard the affected seedlings and the medium around them. Improve air circulation and allow the soil to dry somewhat. After the seedlings are several weeks old, their stems toughen and become less susceptible to this fungus.

Feed your seedlings. Fertilize every two weeks once the first set of "true" leaves appears. (The first leaves are "seed leaves" or cotyledons and do not look like the real leaves of the plant.) Use a liquid fertilizer such as fish emulsion or seaweed, diluted to one-quarter strength of the recommended dose. After two applications, mix the fertilizer at one-half strength if the seedlings seem to be thriving.

Pot on from flats. If your seedlings are growing in open flats, you'll want to select the strongest, healthiest ones to transfer into individual pots with *moistened* potting mix. (Don't plan on just watering afterward; dry potting mix will damage delicate roots.)

Harden off. Your carefully tended

seedlings will fare much better if you give them a chance to harden off before transplanting. This process of gradually exposing seedlings to the growing conditions they'll face outside gives them time to toughen up and adjust to their new surroundings.

Start hardening off your seedlings two weeks before you plan to transplant them to your garden. Stop fertilizing and also reduce the amount of water you give them—but don't let them dry out to the point of wilting. Set the containers in a shaded, sheltered outdoor area during the day. It's best to start with an hour or so outdoors the first day. Then gradually increase the amount of time they spend outdoors, taking care to bring your seedlings in at night or if frost threatens. If you don't have a good site for hardening off your plants, you can use a cold frame shelter, a temporary "box" structure.

If you don't have enough time or space for indoor sowing, don't despair. You can sow many kinds of flowers directly into a prepared seedbed outdoors. Some flowers actually do better started outdoors than inside. Perennials with deep taproots, like butterfly weed (*Asclepias tuberosa*) and poppies, resent transplanting and grow best if you start them where you want them to grow. (You may have to wait two or three years for the seedlings to reach blooming size, but it's the cheapest way to increase your supply of plants.) Certain annual flowers are also good choices for direct-sowing. For those like love-in-a-mist (*Nigella damascena*), which bloom for a short period of time, an early indoor start just means more work, not a longer bloom season. Others, like cosmos and zinnias, are best started outdoors because they'll germinate and grow quickly. There's no need to waste time or take up space growing them indoors.

Flowers with large seeds, such as sunflowers, are good choices for direct-sowing, too. They're easy to handle and can be planted in simple-to-tend rows. Small seeds are more difficult to handle and are

usually broadcast by hand over the planting area. For best results, mix them with 3 or 4 parts dry sand and use a salt shaker or seasoning jar to scatter them evenly over the seedbed. You'll be less likely to dump a pile of tiny seeds all in one spot.

Seed packets provide instructions for outdoor planting dates, depth, and spacing for species that can be direct-sown outdoors. As a general rule, plant seeds at a depth of two to three times their width.

Prepare the seedbed. Then smooth the planting area with a rake and mark the areas for sowing by making a shallow trench or depression where the seeds will go. To plant seeds in a natural configuration, make slight depressions in the soil with your fingers or with a dibble (a pointed tool) in a random, scattered pattern. For straight rows, use stakes with a string stretched between them. Sow your seeds at the appropriate depths, and cover them. To avoid giving tiny seeds a hard soil crust to break through, try covering them with a fine layer of potting soil, screened compost, or vermiculite.

After planting, water the seedbed thoroughly but gently, using a spray or mist nozzle on your hose. A hard stream of water can quickly wash away your carefully sown seedbed. Check on your newly planted seeds daily, and keep the soil constantly moist until the seedlings are up and well established. Use a rain gauge to keep track of the amount of moisture your seedlings are getting—most plants need at least 1 inch of water each week. After a rain, stick your finger in the soil to see how deep the rain penetrated. You may be surprised! If the soil is dry beneath the surface, get the hose and water some more. Small seedlings can dry out and wilt quickly on a sunny day. After your plants are 2 to 3 inches tall, start allowing the soil to dry slightly between waterings. Your seedlings will begin to send their roots farther in search of water and will grow stronger.

MULTIPLYING BY DIVISION

EASY AND RELIABLE, DIVISION IS THE PROPAGATION method favored by most gardeners. Producing new plants in this way offers several advantages. You can propagate a large variety of perennials from divisions, and each new plant will have exactly the same characteristics as the original, or parent, plant. And plants grown from divisions are larger and bloom sooner than those grown from seed. Dividing plants isn't harmful; the parent plant can actually benefit when division is done properly.

Divide perennials when they are growing vegetatively, not when they're in bloom. Use a plant's bloom time to schedule division more specifically: Divide spring- and early-summer-blooming perennials in late summer to early fall, and midsummer- to fall-bloomers in early spring. If you live in Zone 5 or farther north, do most of your division in the spring, to give new plants time to get established before cold weather arrives.

To divide a plant, dig directly around its perimeter with either a trowel, a spade, or a garden fork, and lift it out of the ground. Shake enough soil away to let you see what you're doing; hose soil off if necessary. Some plants, such as coral bells (*Heuchera sanguinea*), are relatively shallow-rooted and lift out easily, while others require more muscle. Large or old clumps of perennial ornamental grasses are very challenging and often require a strong arm to lift them and an axe to cut them apart.

If the exposed roots are thin and fibrous, try tugging and working them apart into smaller clumps with your fingers. To divide plants such as daylilies or hostas that have dense or thickly intertwined roots, you can use the double-fork method to break a clump into smaller pieces. One at a time, shove two garden forks back-to-back into the center of the clump as close as possible. Push the fork handles together at the top, then pull them apart. As this happens, the forks will

break the clump apart into two pieces. Or use an old butcher knife, a sharp spade, or an axe to cut the clump into pieces. Place your cuts so that each new piece has a good amount of roots with it. Cut apart iris rhizomes and other small perennials with a sharp knife.

How large or how small you make your divisions depends on how you want to use them. If you plan to replant them in your flowerbed and want plants that will fill in and bloom immediately, keep the divisions as large as possible. If your goal is

to get as many new plants as you can, break each clump into small pieces, but make sure each piece has enough roots to survive. Before you divide a plant, do a little research to see whether it has any quirks about how it is divided.

If your divisions are headed for a new flowerbed, prepare the soil in the bed before you begin dividing plants. Your divisions will fare better if you minimize the amount of time they spend out of the ground.

Replant only those divisions that have strong, healthy root systems. If a section of roots appears soft, mushy, or discolored, or shows signs of insect damage, or in any way appears unhealthy compared with the rest of the root system, discard it. It's not likely to get better if you replant it, and you could spread the problem to other plants.

When dividing plants in the spring before they start putting out new growth, simply replant the divisions immediately. If you're dividing plants that have produced full stems and leaves, remove one-half to two-thirds of the foliage before you replant. The reduced root system is unable to replace the amount of water lost through substantially larger topgrowth. Don't worry; new sprouts will emerge once the roots get reestablished.

As soon as possible after dividing a plant, replant the divisions at a depth slightly higher than that of the original plant to allow for settling. Firm the soil

around them and water them well.

If you can't replant the new divisions immediately, keep them moist, cool, and shaded. Place them in a flat, and cover them loosely with damp soil, peat moss, or burlap. If they seem dry when you're ready to plant, soak them in a bucket of shallow water for an hour before replanting.

After replanting new divisions, keep them moist and protect them from hot sun and drying winds. Check soil moisture daily and provide partial shade during the hottest part of the day.

NEW PLANTS FROM CUTTINGS

YOU CAN PROPAGATE SOME PLANTS BY CUTTING pieces of the stem or root and forcing them to grow into new plants. The first part—taking the cutting—is easy; convincing the cutting to grow can be somewhat trickier. But cuttings grow into flowering plants more quickly than plants grown from seed, and taking stem cuttings is tidier than digging and dividing portions of your flowerbed. Starting new plants from cuttings is a good way to propagate plants that don't come true from seed or that have taproots and can't be divided. You can also take cuttings from plants that can be divided but aren't yet large enough.

The best time to take stem cuttings is in late spring or early summer, before the new stems harden and mature. Collect cuttings in the morning if possible, when they're full of moisture. Cutting size depends on the type of plant you're collecting from. Smaller cuttings tend to root better and faster, but you may need to take longer cuttings from plants with large leaves and lots of stem space between them.

Fill pots or flats with at least 3 inches of a sterile, loose growing medium. Sand, vermiculite, perlite, and peat moss all work well and may be used alone or in combinations. Moisten the mix thoroughly before you begin planting, and let the excess water drain off.

Cut off any flowers or flower buds from

the tip of the cutting; they will interfere with new root formation. Cut off leaves from the bottom leaf nodes so that you have a bare stem to stick into the soil. To keep your cuttings from wilting, especially during warm weather, you may need to remove a few more leaves, but don't cut off more than half the foliage.

Plant your cuttings with about 1 inch of stem and at least one node below the surface of the planting medium. Separate different species or cultivars into their own pots or rows within a flat, and label them clearly with the plant name and the date you took the cuttings. Firm the medium around your cuttings and water them well. Cover each container with clear plastic to hold in moisture—cuttings need close to 100 percent humidity.

Give your cuttings bright, indirect light. Direct sunlight will cause heat to build up under the plastic, killing the cuttings. Check moisture daily and keep the medium moist without overwatering. Most cuttings will root in two to four weeks; start checking for rooting after two weeks.

Once your cuttings are well rooted, you can transplant them to individual pots or to an outdoor nursery bed until the plants are large enough to go into your flowerbed.

Gardeners who've pulled up thistles, only to have several thistle "babies" appear later in the same area, have unwittingly propagated their foes via root cuttings. Fortunately you can use this technique to propagate more desirable perennials, too. For best results, collect root cuttings when plants are dormant—in fall, winter, or early spring. Actively growing plants transfer most of their energy from the roots to the shoots. Root cuttings taken during late spring or summer generally don't succeed, because their natural energy supply has been diminished.

Dig and lift the plant you wish to take root cuttings from. Remove up to one-third of the strongest, healthiest roots with a sharp knife. Cut off the thin ends of the roots and take cuttings from the middle section. Keep track of which end of the

Stem Cuttings

Use stem cuttings to propagate those perennials that you can't divide or that don't come true from seed. You can also take stem cuttings from divisible plants that are still too small to dig up and divide. The following perennials propagate readily from stem cuttings:

Balloon flower (*Platycodon grandiflorus*)

Bee balm (*Monarda didyma*)

Blue Stars (*Amsonia* spp.)

Butterfly weed (*Asclepias tuberosa*)

Catmint (*Nepeta* spp.)

Pinks (*Dianthus* spp.)

Perennial candytuft (*Iberis sempervirens*)

Sunflower heliopsis (*Heliopsis helianthoides*)

Garden phlox (*Phlox paniculata*)

Golden marguerite (*Anthemis tinctoria*)

Goldenrods (*Solidago* spp.)

Gooseneck and yellow loosestrife (*Lysimachia clethroides* and *L. punctata*)

Obedient plant (*Physostegia virginiana*)

Violet sage (*Salvia × superba*)

Sedum (*Sedum* spp.)

Speedwells (*Veronica* spp.)

root was closest to the plant—and which end was growing away from the plant. Cuttings from roots growing more or less vertically in the soil will not grow if you plant them upside down. As you make

your root cuttings, cut the upper ends horizontally and the lower ends diagonally, so you'll know which is which.

Make each root cutting about 1½ to 2 inches long. You can take more than one cutting from each root. If you can't plant your root cuttings right away, keep them cool and moist in a plastic bag or other container in the refrigerator until you're ready. Make a label for each type of cutting.

To plant, fill flats or shallow wooden boxes with moistened loose, sterile medium, such as sand, vermiculite, perlite, peat moss, or potting soil, or some combination of these. Place root cuttings at a 45-degree angle in the medium, about an inch apart, with the top end up. Leave about ¼ inch of each cutting's upper end exposed to promote topgrowth. Lay thin cuttings horizontally on the growing medium; cover them to a depth of one to two times their thickness. Label each

container or row.

If you take your root cuttings in early spring, late summer, or early fall, cover the containers with plastic and place them in a warm (70° to 75°F) location, out of direct sun. Root cuttings may take from three weeks to two months to sprout new stems. Keep the medium barely moist to avoid problems with rotting. Check occasionally for dryness, and water only as needed.

Once the cuttings begin to sprout, open the plastic to allow air circulation. After several days, remove the plastic and place plants where they'll get more light. Care for them as you would young seedlings. When they're 2 to 3 inches tall, prepare them for transplanting.

If you took your root cuttings in late summer or fall, overwinter them in a cold frame in their dormant state until spring. Then transplant the new plants to pots or a nursery bed for the upcoming growing season.

Prepare your beds well before planting time.

PREPARING FOR Problem-Free Planting

GOOD SITE PREPARATION IS THE FOUNDATION OF A successful flower garden. By preparing the site carefully—removing lawn grass, weeds, or other vegetation and improving the soil before you plant—you provide your flowers with the best possible foundation for a long, healthy, and attractive life. And you save yourself a lot of work spent trying to fix problems down the road.

It's best to prepare your beds well before planting time: Preparing them in the fall for spring planting or in summer for fall planting is ideal. This schedule leaves plenty of time for removing unwanted vegetation, getting a soil test, and working and amending the soil.

CLEARING YOUR SITE

IF THE SITE YOU'VE CHOSEN FOR YOUR FLOWERBED is a patch of lawn or weeds—or an existing bed filled with plants you no longer

want—you first need to remove all the weeds, lawn grass, and other undesirable vegetation growing there. If you don't, these established plants will compete with your newly planted flowers, and they'll very likely win. Use the guidelines below to eliminate existing vegetation effectively and efficiently.

Outline your bed. Before you dig, use string and stakes or a sprinkled line of flour to outline your bed. If you haven't tried to visualize its size already, take a moment to step back and make sure the size, shape, and placement work for you.

Slice away lawn grass. To remove lawn grass, use a spade to cut around rectangular strips and then to slice under the roots to create strips of sod. Roll the strips up as you go, and set them aside. You can use them to patch bare spots in your lawn, or add them to your compost pile. If you're clearing a large area, a rented sod cutter

can save you a great deal of time and effort. For another way to eliminate lawn grass, see "Mulch away lawn," below.

Mulch away perennial weeds and brush. These tough customers present a greater challenge than lawn grass, but you can conquer them with some effort and some advance planning. Starting in spring or summer, pull out as much of the unwanted vegetation as possible, making sure to dig out all the roots you can. Mow the weeds close to the ground. Cover the area with a layer of newspaper, 1 inch or several sections thick. Top the newspaper with a thick layer of compost. (You can also use straw or hay, but compost will look more attractive while you wait.) Leave this thick mulch in place until the following spring. Then pull back the mulch and amend and turn the soil, or install your plants directly into the mulched area.

Mulch away lawn. A layer of newspaper topped by compost will also kill lawn grass over a period of two to three months. If you'd rather not skim off the sod, you can turn it under to add organic matter to the soil. You can also use a newspaper-and-compost mulch over soil where you've removed sod to help kill any surviving grass roots. It's particularly useful if you've removed an especially weedy patch of lawn.

IMPROVING YOUR SOIL

IF YOU DO ONLY ONE THING TO PREPARE YOUR soil for planting, add organic matter. Spreading an inch or two of compost over your cleared site and planting directly into it will give your flowers an adequate start. Even better, spread the compost and dig it into the surface of the soil with a shovel or fork.

That said, keep in mind that the more you do to improve your soil before planting, the better off your flowers will be. Annuals can usually survive the season with only minor soil preparation, but they are absolutely glorious in a well-prepared site. Perennials are a long-term

investment, and the more time and effort you take to improve the soil they're planted in, the better. And once perennials are planted, full-scale soil preparation and amendment becomes much more difficult.

Ideally, you want soil that has good drainage, ample organic matter, near-neutral pH, and plenty of available nutrients. The site you've chosen for your flowerbed should contribute to these conditions. If you suspect that you have prob-

M a k i n g C o m p o s t t h e E a s y W a y

To build a basic, slow, but relatively labor-free compost pile, you need a space of roughly 3 cubic feet in a well-drained area, a collection of materials to compost, and some soil. Pile leaves, grass clippings, and other yard wastes together as they become available, adding a couple of shovelfuls of soil every now and then. Form the pile so that the top is concave, to collect moisture from rain. Stop adding to your pile when it reaches 3 to 4 feet tall; start another one if you need to. After 12 to 18 months, you'll have a good supply of compost. By chopping materials finely, keeping the pile moist, and turning it at least once a week, you can speed up the process.

How can you tell when your compost is "done"? Finished compost is crumbly, dark brown to black, with a good, earthy smell.

lem soil, you'll want to take extra time and effort to improve it before you plant. You

S o i l A m e n d m e n t s

Although compost is the most important soil amendment, there are others you can use.

- Plentiful and free (for most gardeners), green grass clippings decompose quickly, adding little bulk to the soil.
- Dry, brown materials, such as hay, straw, autumn leaves, and sawdust, add bulk to the soil. To speed breakdown, add blood meal or another nitrogen source with any of these.
- The manure from most farm animals improves the soil and is a balanced nutrient source. Let fresh manure dry before adding it to the soil, or use a commercial dried-manure product.
- Earthworm manure, called castings, is a good soil conditioner. Healthy soil brings earthworms (and castings) to your garden. You can also buy castings.

may also want to have a soil test done.

DIGGING IN

DIGGING—THE PROCESS OF BREAKING AND TURNING and amending the soil—may not be the most appealing step on the road to a no-fail flower garden, but it's surely one of the most important. It turns a potentially hard, crusty, airless environment into a

soft, fluffy, friable one that welcomes and nurtures your new plants.

When you dig, focus your attention on the top 12 inches of the soil. That's where most of your flowers will want to spread their roots. If your soil is heavy with clay, consider the onerous but worthwhile task of double-digging (see "Double-Digging for Best Results" on page 37) to improve drainage and aeration. Otherwise, turning and amending the upper 12 inches of soil is sufficient.

Make sure the soil is neither too wet nor too dry when you dig and amend. To tell when soil moisture is right for digging, squeeze a handful of soil from your seedbed. If it sticks together in a clump, the soil is too wet to work. Wait two or three days, then check the moisture again. If the soil is so dry that it doesn't stick together at all, wet the area thoroughly and let it drain overnight. When the soil is slightly moist and crumbly, you're ready to begin.

Start by turning the soil to the depth of your spade or fork. Or use a rotary tiller to turn it to a similar depth. Top the turned area with compost or other organic matter and any amendments you wish to add. Then work the area over again with your spade, fork, or tiller to incorporate these additions and to break up any clods. Water the soil when finished to help settle the bed. If you're preparing your bed well in advance of planting time, cover it with a layer of organic mulch to keep weeds out and to further improve the soil.

Step back
and see how
you
like it.

Your care will **pay** off
with **strong** growth.

READY, SET, Plant!

NOW IT'S FINALLY TIME TO INSTALL YOUR NEW flower garden. The design is ready, the bed is prepared, the plants are waiting. Try to time your planting for a dull or overcast day to avoid the additional stress of intense sunlight on your newly transplanted flowers. Before you actually plant them, set potted plants in beds according to your design; substitute markers or empty pots for bareroot plants or seedlings. Step back and see how you like it. Of course it will look a little sparse at this stage; but with a strong start and continuing care, your plants will fill in quickly. Don't be tempted to squeeze in more plants; your flowers need room to grow. If the bed looks too empty, fill in with annuals and mulch. Fine-tune your design, if necessary, then grab your trowel, spade, and garden gloves and get planting.

MAINTAINING THE Garden

IF YOU'VE PREPARED THE SOIL WELL BEFORE planting, planted carefully, and mulched your garden, you'll be well on your way to a healthy, vigorous garden. But your plants still need some care after planting. Your flower garden will truly flourish if you tend it regularly, even for brief periods of time.

Weeding, watering, staking—these are just a few of the regular chores required to keep your flower garden looking beautiful. The care you lavish upon your flower garden throughout the year will pay off with strong growth and flowering year after year. Here's a run-down on the basics of garden care.

WEEDING

WEEDS COMPETE FOR WATER, NUTRIENTS, AND light, so weeding is a necessary evil. Catch them while they're small, and the task will seem easier. A light mulch of bark or shredded leaves allows water to infiltrate and keeps the weeds down.

WATERING

MOST PLANTS NEED 1 INCH OF WATER per week for best growth. Bog and pond plants require a continual supply. Dry-soil plants are more tolerant of a low water supply, but during the hottest summer months, even they may need occasional watering. Water your garden with a soaker hose where possible and use mulch to help conserve soil moisture and cut down on watering.

STAKING

STAKING MAY BE NECESSARY FOR THIN-STEMMED plants such as coreopsis, yarrow, and garden phlox. Extremely tall plants such as delphiniums require sturdy stakes to keep flower spikes from snapping off. Heavy, mounding flowers like peonies may need hoop supports (circular wire supports set up on legs) to keep their faces out of the mud. You can also stake up a clump of plants by circling it with

twine, then tying the twine to a sturdy stake.

PINCHING

PINCHING OFF THE END BUDS OF STEMS KEEPS plants bushy. Plants like chrysanthemums and asters have a tendency to grow tall and flop. Pinch them once or twice in the spring to encourage production of side shoots. Early pinching promotes compact growth without sacrificing bloom.

THINNING

PLANTS LIKE DELPHINIUMS AND PHLOX PRODUCE so many stems that the growth becomes crowded and vigor is reduced. Cut out excess stems to increase air circulation and promote bigger flowers on the remaining stems.

DISBUDDING

DISBUDDING IS ANOTHER TECHNIQUE USED TO increase flower size. Peonies and chrysanthemums produce many buds around each main bud. Simply pinch off all but the largest bud to improve your floral display.

DEADHEADING

REMOVING SPENT FLOWERS WILL HELP PROMOTE production of new buds in many plants. Just pinch or cut off faded flowers, or shear bushy plants just below the flower heads if

the plant blooms all at once. Some perennials like baptisias and AUTUMN JOY sedum will not rebloom, and their seedheads are decorative. Leave these for winter interest in the garden.

WINTERIZING

IN AUTUMN, BEGIN PREPARING THE PERENNIAL garden for winter. Remove dead foliage and old flowers. After the first frost, cut down dead stems and remove to the ground other growth that will die. (Leave ornamental grasses and other plants that add winter interest.) After the ground freezes, protect plants from root damage as a result of frost heaving with a thick mulch of oak leaves or marsh hay. Evergreen boughs are also good for this purpose. Snow is the best insulator of all, but most of us can't count on continuous snow cover. Mulching helps keep the ground frozen during periods of warm weather.

DIVIDING

SOONER OR LATER, EVEN THE SLOW-GROWING perennials become crowded and need dividing. Divide plants in spring or fall in the North and in fall in the South. (Some plants, such as peonies, should only be dug in the fall.) Some fast growers like bee balms, chrysanthemums, and asters should be lifted every two to three years. Other perennials such as peonies, daylilies, and hostas only

need dividing when they've become overgrown. You'll know a clump is overgrown because it looks crowded, doesn't have as large or as many blooms as it used to, and may have died out in the center.

CONTROLLING PESTS AND DISEASE

THE BEST WAY TO AVOID PROBLEMS IS WITH good cultural practices, good maintenance, and early detection. Healthy plants develop fewer problems. Here are a few simple tips:

- Water early in the day to enable plants to dry before evening. This helps prevent leaf spots and other fungal and bacterial problems.
- Don't overwater. Waterlogged soil is an invitation to root-rot organisms.
- Remove old flowers and yellowing foliage to destroy hiding places for pests.
- Remove and dispose of plants that develop viral infections.
- Never put diseased plants in the compost.
- Early detection of insects means easy control. Many insects can be controlled by treating the plants with a spray of water from a hose. Treat severe infestations with appropriate organic control such as a soap-spray solution. Follow label recommendations.

YOUR Backyard Vegetable Bounty

FRESH-PICKED SWEET CORN, TOMATOES, AND snap peas are a taste treat you can get only from your backyard vegetable garden. The quality and flavor of fresh vegetables will reward you from early in the growing season until late fall. And when you garden organically, you know that your harvest is free of potentially harmful chemical residues.

Although the plants grown in vegetable gardens are a diverse group from many different plant families, they share broad general cultural requirements. Most will thrive in well-drained soil with a pH of 6.5 to 7.0. Some will tolerate frost; others will tolerate shade. You should have little trouble growing vegetables successfully if you pick an appropriate site, prepare the soil well, and keep your growing crops weeded and watered.

Vegetable gardens are ideal sites for putting organic soil improvement and pest management techniques into practice. Since you're working the soil each year, you'll have lots of opportunities to add organic matter and soil amendments that help keep the soil naturally balanced.

As you make your yearly plan for planting and caring for your garden, you can incorporate techniques such as crop rotation, soil enrichment, and other cultural pest-prevention methods. And there's a broad range of organically acceptable pest control methods and products for vegetable crops.

The **best** sites usually
are in the **south** or
west of the house.

PLANNING YOUR Garden

PLANNING YOUR GARDEN CAN BE AS MUCH FUN as planting it. When you plan a garden, you'll balance all your hopes and wishes for the crops you'd like to harvest against your local growing conditions, as well as the space you have available to plant. Planning involves choosing a site (unless you already have an established garden), deciding on a garden style, selecting crops and cultivars, and mapping your garden.

SITE SELECTION

SOMEWHERE IN YOUR YARD, THERE IS A GOOD place for a vegetable garden. The ideal site has these characteristics:

Full or almost full sun. In warm climates, some vegetables can get by on 6 hours of direct sunshine each day, while a full day of sun is needed in cool climates. The best sites for vegetable gardens usual-

ly are on the south or west side of a house, where sunshine is most abundant. If part of the site you select is too shady for planting, put your compost pile there.

Good drainage. A slight slope is good for vegetable gardens. The soil will get well soaked by rain or irrigation water, and excess will run off. Avoid low places where water accumulates.

Limited competition from nearby trees. Tree roots take up huge amounts of water. Leave as much space as possible between large trees and your vegetable garden.

Easy access to water. If you can't get a hose or irrigation line to a prospective garden site, don't plant vegetables there. No matter what your local climate is, you'll most likely have to provide supplemental water at some point in the growing season, or your harvest will suffer.

Accessibility. Organic gardens need large amounts of mulch, plus periodic

infusions of other bulky materials such as well-rotted manure or rock fertilizers. If you have a large garden, you should be able to drive a truck up to its edge for easy unloading. In narrow city lots, the garden access path should be wide enough for a cart or wheelbarrow.

Once you find a site that has these characteristics, double-check for hidden problems. For example, don't locate your garden over septic-tank field lines, buried utility cables, or water lines.

GARDEN LAYOUT

ONCE YOU'VE DECIDED ON A SITE, THINK ABOUT the type of vegetable garden you want. Possible layouts range from traditional row plantings to intensive raised beds and container gardens.

Row planting. A row garden, in which vegetables are planted in parallel lines, is easy to organize and plant. However, it's not as space-efficient as more intensive methods, such as raised beds. You may spend more time weeding unless you mulch heavily and early between rows. Also, you'll get less yield per unit of area than you would from an intensively planted garden. Row planting is quick and efficient for large plantings of crops such as beans or corn.

You can enhance the appearance and productivity of a row garden by making a raised bed along the front edge and planting it with herbs and flowers.

Beds. Productivity, efficient use of space, less weeding, and shading of the soil are all benefits of intensively planted beds. Beds are raised planting areas, generally with carefully enriched soil, so they can be planted intensively. While they require more initial time to prepare, beds save time on weeding or mulching later in the season. Because they're more space-efficient, you'll also get higher yields per unit of area than from a traditional row garden.

Beds for vegetables should be no more than 4 feet wide so you can easily reach

the center of the bed to plant, weed, and harvest.

Spot gardens. If your yard is small, with no suitable space for a separate vegetable garden, look for sunny spots where you can fit small plantings of your favorite crops. Plant a small bed of salad greens and herbs near your kitchen door for easy access when preparing meals. Tuck vegetables into flowerbeds. You can dress up crops that aren't ornamental, such as tomatoes, by underplanting them with annuals such as nasturtiums and marigolds.

Containers. You may not be able to grow all your favorite vegetables in containers, but many dwarf cultivars of vegetables grow well in pots or planters. Garden catalogs include dwarf tomato, cucumber, pepper, and even squash cultivars suitable for container growing. Vegetables that are naturally small, such as loose-head lettuce, scallions, and many herbs, such as basil, also grow nicely in containers.

CROP CHOICES

SEED CATALOGS AND SEED RACKS PRESENT A dazzling array of choices for the vegetable gardener. They all look tasty and beautiful in the pictures, but you must consider what vegetables will work for *your* garden.

Consider the length of your growing season (the period of time between the last frost in spring and the first one in fall), seasonal rainfall patterns, and other environmental factors when choosing vegetables to plant. That's not to suggest that your choices are very limited. There are many fast-maturing and heat- or cold-tolerant cultivars that make it easier for northern gardeners to grow hot-weather crops such as melons and for southern gardeners to be able to enjoy cool-loving crops such as spinach.

Here are some more tips for making the right choices.

Go to the experts. If you're a beginning vegetable gardener, talk with other gardeners you know and get some advice from your local extension agent. Ask what veg-

Small - Garden Strategies

If your appetite for fresh vegetables is bigger than the space you have to grow them in, try these ways to coax the most produce from the least space.

- Emphasize vertical crops (those that grow up rather than out): trellised snow peas, shell peas, pole beans, and cucumbers.
- Interplant fast-maturing salad crops (lettuce, radishes, spinach, and beets) together in 2-foot-square blocks. Succession-plant every two weeks in early spring and early fall.
- Avoid overplanting any single vegetable. Summer squash is the number-one offender when it comes to rampant overproduction. Two plants each of zucchini, yellow-neck, and a novelty summer squash will yield plenty.
- Choose medium- and small-fruited cultivars of tomatoes and peppers. The smaller the fruit, the more the plants tend to produce. Beefsteak tomatoes and big bell peppers produce comparatively few fruits per plant.
- Experiment with unusual vegetables that are naturally compact, such as kohlrabi, bok choy, and oriental eggplant. Try dwarf cultivars of larger vegetables.
- Maintain permanent clumps of perpetual vegetables such as chives, hardy scallions, and perennial herbs. Even a small garden should always have something to offer.

etables grow best in your area, then start with those crops. Most extension services will also provide lists of recommended cultivars.

Remember your region. Seek out catalogs and plant lists offered by seed companies that specialize in regionally adapted selections.

Make a match. Match cultivars to your garden's characteristics and problems.

Look for cultivars that are resistant to disease organisms that may be widespread in your area, such as VF tomato cultivars—which are resistant to *Verticillium* and *Fusarium* fungi.

Study seed quantity. If you buy seeds by the packet, take note of how many seeds you're getting. Seed quantity per packet varies widely. Some packets of new or special cultivars may contain fewer than 20 seeds.

Check health. When buying transplants at local garden centers, always check the plants for disease and insect problems.

Test store knowledge. Ask whether the transplants you're buying have been hardened off yet. If the salesperson doesn't know what you're talking about, take the hint and buy your transplants from a more knowledgeable supplier.

Bigger isn't better. Remember, with transplants, larger size doesn't always mean better quality. Look for stocky transplants with uniform green leaves. Don't buy transplants that are already flowering—they won't survive the shock of transplanting as well as younger plants will.

Remember why you're gardening. Have some fun when you choose plants for your vegetable garden. Base some of your selections on beauty as well as flavor. For example, beans with purple or variegated pods are easy to spot for picking and lovely to behold. Look through catalogs and try some of the heirloom or other unusual cultivars they offer.

GARDEN MAPPING

AS YOU FILL OUT SEED ORDER FORMS, IT'S WISE to map planned locations for your crops. Otherwise, you may end up with far too little or too much seed. Depending on the size of your garden, you may need to make a formal plan drawn to scale.

Consider these points as you figure out your planting needs and fill in your map:

- Are you growing just enough of a crop for fresh eating, or will you be preserv-

ing some of your harvest? For some crops, it takes surprisingly little seed to produce enough to feed a family. You can refer to seed catalogs for information on how much to plant.

- Are you planning to rotate crops? Changing the position of plants in different crop families from year to year can help reduce any pest problems.
- Are you going to plant crops in spring and again later in the season for a fall harvest? Order seed for both plantings at the same time.

Soil with high organic-matter content is paramount in importance.

GETTING SET TO Plant

SINCE MOST VEGETABLES ARE FAST-GROWING annuals, they need garden soil that provides a wide range of plant nutrients and is loose enough for plant roots to penetrate easily. In an organic vegetable garden, soil with high organic-matter content and biological activity is paramount in importance. Every year when you harvest vegetables, you're carting off part of the reservoir of nutrients that was in your vegetable garden soil. To keep the soil in balance, you need to replace those nutrients. Look for every opportunity to incorporate different forms of organic matter into your soil.

ASSESSING YOUR SOIL

IF YOU'RE STARTING A NEW VEGETABLE GARDEN OR switching from conventional to organic methods (or if you've just been disappointed with past yields or crop quality), start by testing your soil. Soil acidity or alkalinity,

which is measured as soil pH, can affect plant performance. Most vegetables prefer soil with a pH of 6.5 to 7.0. Overall soil fertility will also influence yield, especially for heavy-feeding crops such as broccoli and tomatoes. A soil test will reveal soil pH as well as any nutrient imbalances. Soil-test kits are available from your local Cooperative Extension Service and at many garden centers. For a more complete analysis, try a private laboratory.

CREATING NEW GARDENS

IF YOU'RE JUST STARTING OUT, YOU'LL PROBABLY be tilling under sod, or possibly bare ground, to start your garden. Using a rotary tiller may be the only practical way to work up the soil in a large garden. But whether you're working with a machine or digging by hand, use care. Don't work the

S o m e L i k e I t H o t

Because vegetables differ so much in their preferred growing temperatures, planting a vegetable garden isn't a one-day job. Be prepared to spend several days over the course of early spring to early summer planting vegetable seeds and plants. You'll plant cool-weather crops a few weeks before the last spring frost. Set out warm-weather crops just after the last spring frost. Hot-weather crops cannot tolerate frost or cold soil. Unless you can protect them with a portable cold frame or row covers, plant them at least three weeks after the last spring frost. In warm climates, plant cool-weather crops again in early fall so that they grow during the fall and winter.

Here's a guide to the temperature preferences of 30 common garden vegetables:

Cool

Beets
Broccoli
Cabbage
Cauliflower
Celery
Garden peas
Lettuce
Onions
Radishes
Spinach
Turnips

Warm

Cantaloupes
Carrots
Chard
Corn
Cucumbers
Peppers
Potatoes
Pumpkins
Snap beans
Squash
Tomatoes

Hot

Eggplant
Field peas
Lima beans
Okra
Peanuts
Shell beans
Sweet potatoes
Watermelons

soil when it's too wet or too dry; that would have detrimental effects on soil structure and quality.

When transforming a plot of lawn into a vegetable garden, try cultivating strips or beds in the sod. You'll only have to contend with weeds in the beds. Plus, you'll have excellent erosion control and no mud between the rows, which makes picking easier and more enjoyable. Just overlap your tilling so that the finished bed is 1½ to 2 times the cutting width of your tiller. Start out with a slow wheel speed and shallow tilling depth. Gradually increase speed and depth as the sod becomes more and more workable. Make the beds as long or as short as you want,

but space them about 3 feet apart.

Depending on how tough the sod and your tiller are, you may have to retil in a week or two or hand-dig stubborn grass clumps to make a proper seedbed.

Depending on the results of your soil tests, you may need to work in some lime to correct pH, or rock fertilizers to correct deficiencies, as you dig your garden. In any case, it's always wise to incorporate organic matter as you work.

ENRICHING THE SOIL

IF YOU'RE AN EXPERIENCED GARDENER WITH AN established garden site, you can take steps to replenish soil nutrients and organic

D o u b l e - D i g g i n g f o r B e s t R e s u l t s

If you're ambitious, a great way to start a vegetable garden is by double-digging the soil. This process thoroughly loosens the soil so that it will retain more water and air, have better drainage, and be easier for the roots to penetrate. Here's the best technique:

1. Several days in advance, mark off the area you plan to dig, and soak the soil with water. A few days later, remove weeds or sod and loosen the top 1 foot of soil with a spading fork.
2. The next day, begin digging, starting at one end of the marked area. With a spade, dig a 1-foot-wide by 1-foot-deep trench. Pile the topsoil from that trench onto a ground cloth or garden cart.
3. To loosen the exposed subsoil, stick your spading fork deeply in the soil and twist and wiggle the fork to loosen up the clumps. Spread a shovelful of organic matter over the surface of the exposed subsoil.
4. Slide the topsoil from the next 1-foot section of the bed onto the subsoil in the first trench. Loosen the subsoil in the second trench.
5. Continue down the bed, shifting the topsoil and loosening the subsoil.
6. At the end of the bed, use the reserved topsoil from the first trench to fill in the last trench.
7. Spread compost or other organic matter over the entire bed and use a spading fork to work it into the top 4 to 6 inches of the soil.

matter as soon as you harvest and clear out your garden in the fall. Sow seed of a green manure crop in your garden, or cover the soil with a thick layer of organic mulch. Both green manures and mulches protect the soil from erosion and improve organic matter content. In the spring, you'll be ready to push back or incorporate the mulch or green manure and start planting.

If you don't plant a green manure crop, spread compost or well-rotted manure over your garden in spring and work it into the soil. You can add as much as a 6-inch layer of organic material, if you're fortunate enough to have that much on hand. The best time to do this is a few weeks before planting, if your soil is dry enough to be worked.

You can cultivate with a rotary tiller or by hand, using a turning fork and rake. Never cultivate extremely wet soil, or you'll be compacting it instead of aerating it. Be conservative when you work the soil. While some cultivation is necessary to prepare seedbeds and to open up the soil for root growth, excess cultivation is harmful. It introduces large amounts of oxygen into the soil, which can speed the breakdown of soil organic matter. And if soil is too wet or too dry, cultivating it can ruin its structure.

Other opportunities for improving your soil will crop up at planting time, when you add compost or other growth boosters in planting rows or holes, and during the growing season, as you mulch your developing plants.

There are practically no limits to the **ways** you can arrange **plants**.

PLANTING YOUR Crops

PLANTING SEASON CAN BE THE BUSIEST TIME OF year for the vegetable gardener. Some careful planning is in order. To help you remember what you have planted and how well cultivars perform in your garden, keep written records. Fill in the planting dates on your garden map as the season progresses. Later, make notes of harvest dates. If you'd like to keep more detailed records, try keeping a garden journal, or set up a vegetable garden data file on index cards or a computer. With good records, you can discover many details about the unique climate in your garden, such as when soil warms up in the spring, when problem insects emerge, and when space becomes available for replanting.

pathways into the raised rows or beds. As soon as possible, mulch the pathways with leaves, straw, or another biodegradable mulch. Lay mulch thickly to keep down weeds. If you live in a region that has frequent, heavy rain, place boards down the pathways so you'll have a dry place to walk.

You can prepare planting beds and rows as much as several weeks before planting. However, if you plan to leave more than three weeks between preparation and planting, mulch the soil so it won't crust over or compact.

Remember, there are practically no limits to the ways you can arrange plants in a vegetable garden. In a traditional row garden, single rows are good for upright bushy plants and those that need good circulation such as tomatoes and summer squash. Use double rows for trellised plants such as pole beans and cucumbers and for compact bushes such as snap

FROM DREAM TO GARDEN

ONCE THE SOIL IS PREPARED, LAY OUT YOUR garden paths. Then rake loose soil from the

R o t a t i n g V e g e t a b l e F a m i l i e s

Susceptibility to pests and diseases runs in plant families. Leave at least two, and preferably three or more, years between the times you plant members of the same crop in an area of your garden. When planning your rotations, keep in mind that some crops are heavy feeders, taking up large amounts of nutrients as they grow, while others are light feeders. Balance plantings of heavy feeders with soil-restoring legumes or green manure crops. Here are the seven family groups most often planted in vegetable gardens, plus ideas for rotating them.

FAMILY NAME	COMMON CROPS	ROTATION RELATIONS
Cruciferae	Broccoli, brussels sprouts, cabbage, cauliflower, kale, radishes, turnips	High level of soil maintenance required for good root health. Heavy feeders. Precede with legumes; follow with open cultivation and compost.
Cucurbitaceae	Cucumbers, melons, squash, pumpkins, watermelons	For improved weed and insect control, precede with winter rye or wheat. Follow with legumes.
Gramineae	Wheat, oats, rye, corn	Plant before tomato- or squash-family crops to control weeds and to improve soil's ability to handle water.
Leguminosae	Beans, peas, clovers, vetches	Beneficial to soil and have few pest problems. Rotate alternately with all other garden crops whenever possible.
Liliaceae	Onions, garlic	Rotate with legumes, but avoid planting in soil that contains undecomposed organic matter.
Solanaceae	Eggplant, peppers, potatoes, tomatoes	Heavy feeders with many fungal enemies. Precede with cereal grain or grass; follow with legumes.
Umbelliferae	Carrots, parsley, dill, fennel, coriander	Moderate feeders. Precede with any other plant family, but condition soil with compost before planting. Follow with legumes or heavy mulch.

beans and potatoes. If you have raised rows or raised beds, you can interplant (mix different types of crops in one area) and use a variety of spacing patterns to maximize the number of plants in a given area. Matrix planting is good for interplanting leafy greens such as lettuce and spinach and root crops such as carrots and onions. A zigzag arrangement works well for interplanting vegetables and flowers.

Frequently you can practice succession cropping—growing two vegetable crops in the same place in the same growing season. You'll plant one early crop, harvest it, and then plant a warm- or hot-season crop afterward. To avoid depleting the soil, make sure one crop is a nitrogen-fixing legume, and the other a light feeder. All

vegetables used for succession cropping should mature quickly. For example, in a cool climate, plant garden peas in spring and follow them with cucumber or summer squash. Or after harvesting your early crop of spinach, plant bush beans. In warm climates, try lettuce followed by field peas, or plant pole beans and then a late crop of turnips after the bean harvest.

SEEDS OR TRANSPLANTS?

SOME VEGETABLE CROPS GROW BEST WHEN seeded directly in place. Other crops benefit from being coddled indoors during the seedling stage and then grow robustly after transplanting.

You can plant many kinds of vegetable seeds directly into prepared soil. But even when you follow seed-spacing directions given on the seed packet, direct-seeded crops often germinate too well or not well enough. When germination is excellent, thin plants ruthlessly because crowded vegetable plants will not mature properly. When direct-seeding any vegetable, set some seeds aside so you can go back in two weeks and replant vacant spaces in the row or bed.

Soil temperature and moisture play important roles in germination of vegetable seeds. Very few vegetable seeds will sprout in cold soil. High soil temperatures also inhibit germination.

Be sure to plant each type of seed at the

recommended planting depth, and firm the soil with your fingers or a hand tool after planting to ensure good contact of seed and soil.

To get a head start on the growing season or escape poor outdoor germination conditions, many gardeners start seed indoors. Tomatoes, peppers, eggplant, cabbage, broccoli, cauliflower, brussels sprouts, onions, and celery are almost always handled this way. Cold-climate gardeners might add lettuce and members of the squash family to this list.

Keep in mind that most vegetable seedlings need sun to grow well. A sunny windowsill is adequate for vegetable seedlings, but natural sun plus supplemental artificial light is best. Also remember that vegetables started indoors receive very little exposure to stress factors present outdoors, such as wind, fluctuating temperatures, and intense sunlight. One week before you plan to transplant, begin hardening off vegetable plants by exposing them to these natural elements. Move plants to a protected place outdoors, or put them in a cold frame.

If temperatures are erratic or windy weather is expected, use cloches to protect tender seedlings from injury for two or three weeks after transplanting. Remove cloches when the plants begin to grow vigorously—a sign that soil temperature has reached a favorable range and roots have become established.

In late summer, sun and heat can sap moisture from the new transplants of your fall crops faster than the roots can replenish it. Protect seedlings and transplants with shade covers instead of cloches. You can cover plants with cardboard boxes or flowerpots on sunny days for one week after transplanting, or you can cover them with a tent made of muslin or some other light-colored cloth.

Get in the **habit** of taking regular garden **walks**.

CARE DURING THE Season

AFTER THE RUSH OF PLANTING, THERE'S A LULL while most of your crops are growing, flowering, and setting fruit. But regular plant care is important if you want to reap a good harvest later in the season. Get in the habit of taking regular garden walks in order to thin crops, pull weeds, and check for signs of insect and disease problems.

WEEDING

START WEED CONTROL EARLY AND KEEP AT IT throughout the season. Remove all weeds within 1 foot of your plants, or they'll compete with the vegetables for water and nutrients. If you use a hoe or hand cultivator, be careful not to injure crop roots.

Some vegetables benefit from extra soil hilled up around the base of the plant. When hoeing around young corn, potatoes, tomatoes, and squash, scatter loose soil from between rows over the root

zones of the plants. Once the garden soil has warmed (in late spring or early summer), mulch around your plants to suppress weeds and cut down on moisture loss. If you have areas where weeds have been a problem in the past, use a double mulch of newspapers covered with organic material such as leaves, straw, grass clippings, or shredded bark.

Another solution to weed problems is to cover beds with a sheet of black plastic. The plastic can help warm up cold soil, and it is a very effective barrier to weeds. If you do use black plastic, buy the thickest sheets you can find, and use them over and over again. Don't leave the plastic in place in the garden any longer than necessary, since exposure to sunlight will quickly degrade it. As soon as you remove the crop, rinse off and store plastic sheeting in a cool place.

W e e d i n g O u t t h e S e e d s

Over a period of years, you can reduce the number of weed seeds present in your vegetable garden. Here's how:

- Mulch heavily and continuously to deprive weeds of sunlight.
- Remove all weeds before they produce seeds.
- Plant windbreaks along any side of the garden that borders on woods or wild meadows. Shrubs and trees can help filter out weed seeds carried by the wind.
- Grow rye as a winter cover crop. Rye residue suppresses weed germination and growth.
- Solarize soil to kill weed seeds in the top 3 inches of prepared beds.

WATERING

IN THE VEGETABLE GARDEN, SOME SUPPLEMENTAL water is invariably needed, especially from midsummer to early fall. Most vegetables need $\frac{1}{2}$ to 1 inch of water each week, and nature rarely provides water in such regular amounts. Dry weather can strengthen some vegetable plants by forcing them to develop deep roots that seek out moisture. However, the quality of other crops suffers when plants get too little water. Tomatoes and melons need plenty of water early in the season when they're initiating foliage and fruit. But then, as the fruit ripens, its quality often improves if dry conditions prevail. The opposite is true of lettuce, cabbage, and other leafy greens, which need more water as they approach maturity.

How can you tell when your crops really need supplemental water? Leaves that droop at midday are a warning sign. If leaves wilt in midday and still look wilted the following morning, the plants are suffering. Provide water before soil becomes this dry.

If you don't water in time and the soil dries out completely, replenish soil mois-

ture gradually, over a period of three days. Soaking dry soil too quickly will cause your drought-stressed crops to suddenly take up large amounts of water. The abrupt change may cause tomatoes, melons, carrots, cabbage, and other vegetables to literally split their sides, ruining your crop.

Watering by hand, using a spray nozzle on the end of a hose, is practical in a small garden but can be time-consuming in a large one. Sprinklers are easier to use but aren't water efficient. Some of the water from a sprinkler may fall on areas that don't need watering, and on a sunny day, some water evaporates and never reaches your plants' roots. Using sprinklers can saturate foliage, leading to conditions that favor some diseases, especially in humid climates. The one situation in which watering with a sprinkler may be the best option is that of newly seeded beds, which need to be kept moist gently and evenly.

In terms of both water usage and economy of labor, the best way to water a vegetable garden is to use a drip irrigation system. You can buy several different types, including versatile systems that "weep" water into soil via porous tubing or pipes. These systems are most efficient when you install them between soil and mulch and use them at low pressure. Water seeps slowly into the soil, and there is very little surface evaporation.

Many gardeners make their own irrigation lines by punching holes into short lengths of garden hose or plastic pipe. You can also drip water to your vegetables by punching small holes in the bottoms of plastic milk jugs, filling the jugs with water, and placing them over the roots of thirsty plants.

Irrigation pipes do not take the place of a handy garden hose—you need both. Buy a two-headed splitter at the hardware store and screw it onto the faucet you use for the vegetable garden. Keep the irrigation system connected to one side, leaving

the other available for hand-watering or other uses.

STAKING

MANY VEGETABLES NEED STAKES OR TRELLISES TO keep them off the ground. Without support, the leaves and fruits of garden peas, tomatoes, pole beans, and some cucumbers and peppers easily become diseased. Also, many of these crops are easier to harvest when they're supported, because the fruits are more accessible.

FERTILIZING

KEEPING YOUR SOIL NATURALLY BALANCED WITH A good organic-matter content will go a long way toward meeting the nutrient needs of your crops. Crops that mature quickly (in less than 50 days) seldom need supplemental fertilizer when growing in a healthy soil, especially if they're mulched. But vegetables that mature slowly often benefit from a booster feeding in midsummer.

Plan to fertilize tomatoes, peppers, and corn just as they reach their reproductive stage of growth. Sprinkle cottonseed meal or a blended organic fertilizer beneath the plants just before a rain. Or rake back the mulch, spread a $\frac{1}{2}$ -inch layer of compost or rotted manure over the soil, and then put the mulch back in place. When growing plants in containers, feed them a liquid fertilizer such as manure tea every two to three weeks throughout the season. You can also use manure tea to feed vegetables in the ground.

Foliar fertilizing—spraying liquid fertilizer on plant leaves—is another option for midseason fertilization. Kelp-based foliar fertilizers contain nutrients, enzymes, and acids that tend to enhance vegetables' efforts at reproduction. They're most effective when plants are already getting a good supply of nutrients through their roots. Use foliar fertilizers as a midseason tonic for tomatoes, pole beans, and other vegetables that produce over a long period.

Tea Time for Your Plants

Your vegetables will find a bucket of manure tea or compost tea as refreshing as you find your morning cup of herbal tea, and it's just as easy to make. Put a shovelful of fresh or dried manure (or finished compost) in a burlap or cheesecloth bag. (You can also make your own bag using a big square of either fabric.) Tie the top closed and sink the sack in a large bucket or barrel of water. Cover the container and steep the "tea" for one to seven days. (As with real tea, the longer it steeps, the stronger it gets.)

Use the tea full-strength as a liquid fertilizer around your plants, or dilute it and use it to give plants a boost when you water. You can also use manure or compost tea with drip irrigation systems if you filter it through cheesecloth or old panty hose first so it doesn't clog the tubes. Manure and compost tea are both great for foliar feeding.

POLLINATION

YOU'LL HARVEST LEAFY GREENS, CARROTS, AND members of the cabbage family long before they flower. But with most other vegetables, the harvest is a fruit—the end result of pollinated blossoms. A spell of unusually hot weather can cause flowers or pollen grains to develop improperly. Conversely, a long, wet, cloudy spell can stop insects from pollinating. Either condition can leave you with few tomatoes, melons, or peppers, or with ears of corn with sparse, widely spaced kernels. The blossom ends of cucumbers and summer squash become wrinkled and misshapen when pollination is inadequate.

To prevent such problems, place like vegetables together so the plants can share the pollen they produce. Two exceptions here are hot and sweet peppers, and super-sweet and regular hybrid corn: Separate these by at least 25 feet to limit the amount of cross-pollination that

takes place, or your harvest may not be true to type.

Tomatoes, corn, and beans are pollinated primarily by wind, though honeybees and other insects provide a little help transporting pollen about the plants. The presence of pollinating insects is crucial for squash, cucumbers, and melons. Plant flowers near these crops to lure bees in the right direction.

PEST AND DISEASE MANAGEMENT

PESTS AND DISEASES OF VEGETABLE CROPS include insects, fungi, bacteria, and viruses, as well as larger animals such as raccoons and deer. Fortunately for organic gardeners, there are ever-increasing numbers of vegetable cultivars that are genetically resistant to insects and diseases. If you know that a pest or disease has been a problem in your garden, seek out and plant a resistant cultivar whenever possible.

Prevention can go a long way toward solving insect and disease problems in the vegetable garden. An important part of your continuing care for your garden is to practice the principles of organic pest management. It's important to realize that a weed-free or insect-free environment is not a natural one. If your garden is a diverse miniature world, with vigorous plants nourished by a well-balanced soil and an active population of native beneficial insects and microorganisms, you'll likely experience few serious pest problems.

Animal pests. Rabbits, woodchucks, deer, and other foraging animals can wreak havoc in a vegetable garden. A sturdy fence is often the best solution.

Insects. Insects are a natural part of the organic garden. But don't allow them to wreak havoc. When insects threaten to remove more than 20 percent of the leaves on any vegetable plant or are known to carry viral diseases, it's time for you to intervene. In most cases, once you've identified the pest that's damaging your crop, you'll be able to control it by implement-

ing one of the following five treatments:

- ✦ Handpick or gather the insects with a net or hand-held vacuum. As you gather them, put the bugs in a container filled with very hot water or alcohol. Set the container in the sun until the bugs die.
- ✦ Spraying insecticidal soap is effective against aphids on leafy greens, thrips on tomatoes, and several other small, soft-bodied pests.
- ✦ Use floating row covers as a barrier to problem insects. Row covers are particularly useful in protecting young squash, cucumber, and melon plants from insects. Remember to remove the cover when the plants begin to flower. You can also wrap row covers around the outside of tomato cages to discourage disease-carrying aphids and leafhoppers.
- ✦ BT (*Bacillus thuringiensis*) gives excellent control of leaf-eating caterpillars. It is often indispensable when you're growing members of the cabbage family, which have many such pests, and when hornworms are numerous enough to seriously damage tomatoes. A special strain—BTSD (B.t. var. *san diego*)—is available that is effective against the most common enemy of potatoes, the larvae of Colorado potato beetles.

Diseases. Vegetable crop diseases are less threatening in home gardens than they are in farm fields, where crops are grown in monoculture. When many different plants are present, diseases that require specific host plants have a hard time gaining a firm foothold. Plus, a healthy, naturally balanced soil contains many beneficial microorganisms capable of controlling those that are likely to cause trouble.

Two of the best techniques for combating disease problems in the vegetable garden are rotating crops and solarizing the soil. Rotate crops by planting them in different places in the garden from one year to the next. When you plant the same

vegetable continually in the same spot, disease organisms that feed on the plant flourish. When crops change from year to year, the disease organisms don't have a host plant and will not build up large populations.

Where diseases, weeds, soil-dwelling insects, or root knot nematodes seriously interfere with plant health, you can often get good control by subjecting the soil to extreme temperatures. Leave the soil openly exposed for a few weeks in the middle of winter. In the hottest part of summer, solarization can kill most weed seeds, insects, and disease organisms present in the top 4 inches of soil.

Prompt harvesting prolongs the **lifespan** of many vegetables.

HARVEST AND Storage

AS A GENERAL RULE, HARVEST YOUR VEGETABLES early and often. Many common vegetables, such as broccoli, garden peas, lettuce, and corn, are harvested when they are at a specific and short-lived state of immaturity. Also be prompt when harvesting crops that mature fully on the plant, such as tomatoes, peppers, melons, and shell beans. Vegetable plants tend to decline after they have produced viable seeds. Prompt harvesting prolongs the lifespan of many vegetables.

KNOWING WHEN TO PICK

USE "DAYS TO MATURITY" LISTED ON SEED PACKETS as a general guide to estimate when vegetables will be ready to pick. Bear in mind that climatic factors such as temperature and day length can radically alter how long it takes for vegetables to

mature. Vegetables planted in spring, when days are becoming progressively longer and warmer, may mature faster than expected. Those grown in the waning days of autumn may mature two to three weeks behind schedule.

In summer, harvest vegetables mid-morning, after the dew has dried but before the heat of midday. Wait for a mild, cloudy day to dig your potatoes, carrots, and other root crops so they won't be exposed to the sun. To make sure your homegrown vegetables are as nutritious as they can be, harvest and eat them on the same day whenever possible.

STORAGE BASICS

REFRIGERATE VEGETABLES THAT HAVE A HIGH water content as soon as you pick them. These include leafy greens, all members of the cabbage family, cucumbers, celery,

beets, carrots, snap beans, and corn. An exception is tomatoes—they ripen best at room temperature.

Some vegetables, notably potatoes, bulb onions, winter squash, peanuts, and sweet potatoes, require a curing period to enhance their keeping qualities.

Bumper crops of all vegetables may be canned, dried, or frozen for future use. Use only your best vegetables for long-term storage, and choose a storage method appropriate for your climate.

For example, you can pull cherry tomato plants and hang them upside down until the fruits dry in arid climates, but not in humid climates. In cold climates, you can mulch carrots heavily to prevent them from freezing and dig them during the winter. In warm climates, carrots left in the ground will be subject to prolonged insect damage.

Consider planting a green manure crop such as rye.

OFF-SEASON Care

AFTER YOU HARVEST A CROP IN YOUR VEGETABLE garden, either turn under or pull up the remaining plant debris. Many garden pests overwinter in the skeletons of vegetable plants. If you suspect that plant remains may harbor insect pests or disease organisms, put them in sealed containers for disposal with your trash, or compost them in a hot (at least 160°F) compost pile.

As garden space becomes vacant in late summer and fall, cultivate empty spaces and allow birds to gather grubs and other

larvae hidden in the soil. If several weeks will pass before the first hard freeze is expected, consider planting a green manure crop such as crimson clover, rye, or annual ryegrass.

Another rite of fall is collecting leaves, which can be used as a winter mulch over garden soil or as the basis for a large winter compost heap. As you collect the leaves, shred and wet them thoroughly to promote leaching and rapid decomposition. You can also till shredded leaves directly into your garden soil.





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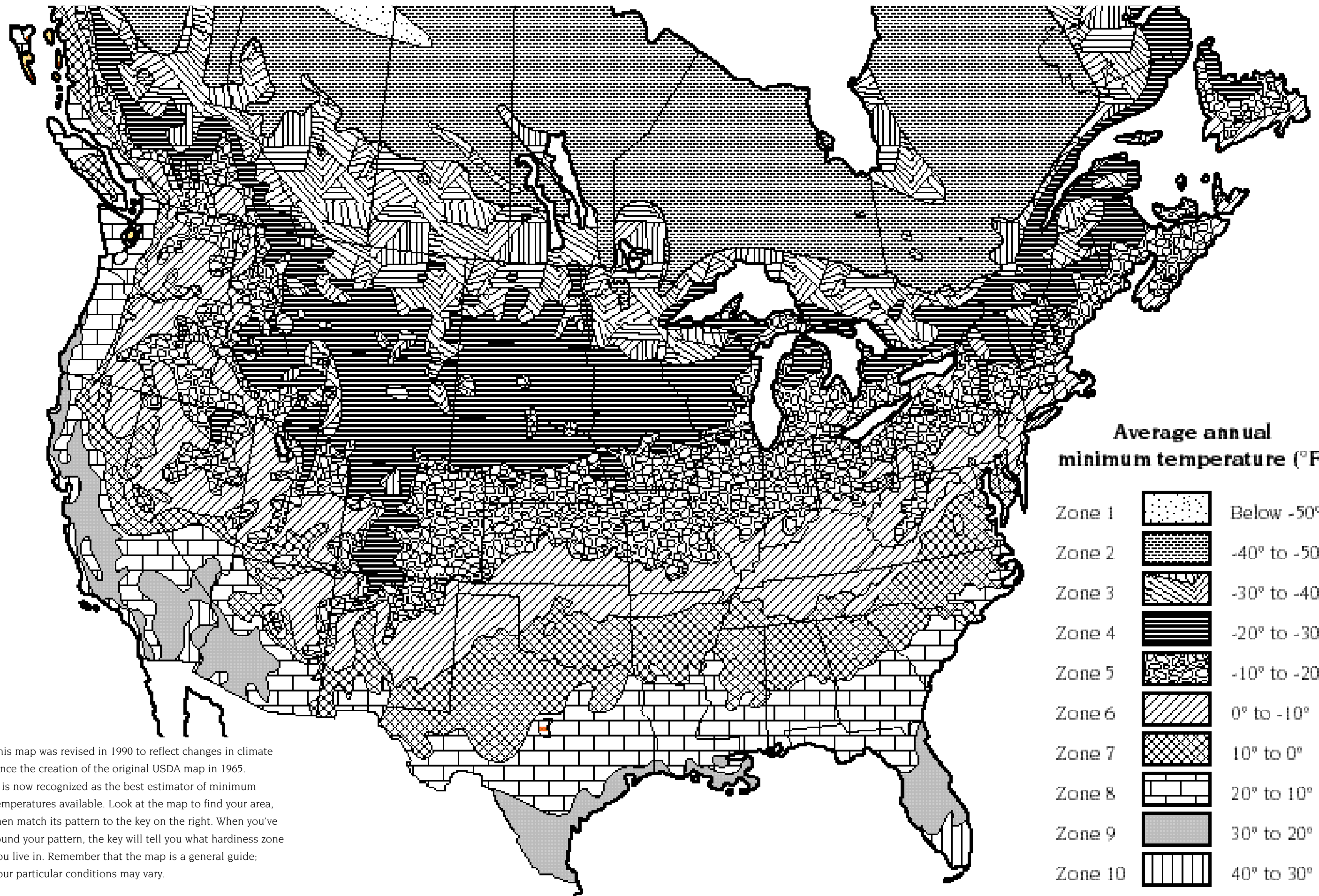
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